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Indian Women, Health, and Productivity

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Documentation of the interaction of Indian women's poor health status and low productivity and evidence that raising the economic value of women is ultimately the most effective way of improving their health.

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This paper — a product of the Women in Development Division, Population and Human Resources Department — is part of a larger effort in PRE to understand the linkages between improving women's access to education, extension training, credit, health care and other public resources, and increasing women's productivity and thus family welfare. Copies are available free from the World Bank, 1818 H Street NW, Washington DC 20433. Please contact Rose Vo, room S9-125, extension 35108 (130 pages, with figures and tables).

To overcome constraints on Indian women's access to health care requires social interventions (freeing women to seek health care), economic interventions (improving the opportunity costs of their doing so), and service interventions (making relevant health care services more easily and widely available).

Over the long term, the most effective means of improving women's health and reducing fertility levels are those that will raise the perceived economic value of women.

Among the other issues discussed in this major report are the following:

Women get less to eat than men, which limits their physical development, reproductive success, and productivity. The cycle of malnutrition produces low birth weight and low infant and maternal survival — which encourages another round of high fertility and attendant stress on the women and on society's resources.

Efforts to improve women's participation in the labor force should be linked to efforts to provide support facilities for child care and maternal and child health.

The critical target group for fertility planning is rural adolescent girls, who must be given educational and vocational opportunities and prepared for marriage and motherhood. Half of all rural girls aged 15 to 19, and 44 percent of *all* girls in this age group, are married. Providing more and better education and employment for girls and women is an important strategy for delaying the marriage age and reducing fertility and infant mortality.

In the short term, the most effective means of improving women's health is to increase the number and improve the training and deployment of village-based health care workers (mainly women) and their ability to deliver health care services to women in their homes.

One way to strengthen the function and local connections of these women might be to organize their services and training around a single major health intervention: distributing iron-folate tablets to control anemia, which affects more than 60 percent of Indian women. Anemia increases women's susceptibility to illness, complications in pregnancy, maternal deaths, and survival, generally. Thus it lowers their productivity.

Improving health, nutrition, and family planning services — all three together — will improve the balance between the energies women expend in production and reproduction and their rewards.

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A Two-Way Relationship

i. That the health status of women affects their productivity, and thereby their roles in society and development, is almost too obvious a statement to require explanation. The nature and extent of this relationship are important to establish, however, particularly in the context of poverty, where women's work is essential for family survival or for improved "quality of life." This paper seeks, therefore, to document Indian women's health status; it hopes to enhance understanding of the set of constraints on women's productivity that are related to ill health.

ii. It may be equally obvious that productivity affects health. But the effects of work, income, or socioeconomic status on women's health or of women's productive work on family health have not been previously assessed. The second aim of this paper is, therefore, to collate and analyze available information on the health effects of Indian women's work, so that efforts to enhance women's productivity can be adequately informed of their potential impact on health. This two-way relationship is complex and complicated by a host of intervening factors such as women's education, marriage, and fertility. Some attempts are made to bring these to bear on the analysis of health and productivity.

Women's Health Status

iii. The review of women's health status establishes that females are worse off than males in terms of mortality up to the age of 35 years, after which they have lower mortality rates. This pattern is inversely related to women's social and economic value. The cultural preference for sons, and consequent bias against daughters, and the "triple burden" placed on young women -- reproduction, domestic work, and productive labor -- result in females' low survival in early life. Their prospects improve when they pass the reproductive stage, are established earners, and have social status as mothers-in-law.

iv. The higher mortality of females in early life accounts for the skewed sex ratio characteristic of the Indian subcontinent. It is worth stressing that the large deficit of females in India, 935 females for every 1,000 males, is due primarily to the male-female differential in mortality under the age of five years. Attention to young female children is essential for a rectification of this population imbalance. While rural-urban and regional differences in male-female mortality differentials suggest that lower socioeconomic levels are associated with lower female survival, there is evidence that at the household level females survive better in poor families. This paradox is perhaps explained by the economic value of women relative to men; this value is high in individual poor families but low in populations where female labor-force participation is restricted.

v. Qualitative information on female mortality reveals only a few causes of death. Among the youngest age groups, malnutrition is a frequent direct or underlying cause. Beyond the critical survival age of 5 years, poor nutrition continues to be an associated cause, particularly in the form of anemia. Anemia affects over 60 percent of Indian women, lowering their work performance both directly and indirectly, through increased morbidity. It is also well-

established that anemia complicates pregnancies; the result is maternal deaths, low birth weight infants, and lower child survival.

vi. While causes of death related to "maternity", are important in India because of the heavy reproductive burden borne by women, "maternal mortality" accounts only for 2.5 percent of all female deaths. The maternal mortality rate is 50 times that in developed countries. Yet the actual risk of an Indian woman dying from a maternity-related cause is more than 200 times greater: she is exposed to 5 or 6 pregnancies compared with 1 or 2 among women in developed countries. And maternal mortality is only a small segment of preventable female death in India.

vii. Among other major causes of death, the most important are respiratory diseases such as tuberculosis, pneumonia, and bronchitis, fevers related to malaria, typhoid, gastroenteric, and other infectious diseases. The distribution pattern appears roughly similar for males and females of different age groups and in different areas of the country. There is evidence, however, that women are more susceptible than men to those diseases that cause death. When men and women in the same household are compared, female morbidity -- prevalence of illness -- is usually higher than that among males. One explanation for this is that female illnesses are treated less frequently and later, since women's access to health care is limited.

viii. While the major morbidities are "general" diseases which affect both males and females, some 'female-specific' problems exist that add to the sickness load. Besides pregnancy-related conditions, gynecological infections are common among all classes of women. There are also "social" health problems such as infertility, wife-beating, or burning, which affect women's health status. A variety of occupational diseases affect women workers in agriculture or industry; they involve working posture, exposure to toxins, crowded working conditions, or physical stress. Many of these conditions are exacerbated by -- and exacerbate -- malnutrition, anemia, and childbearing. Women's low social status makes it difficult for them to mobilize to remove these social and occupational hazards. Legislation remains inadequate in content or reach. The low wages paid to women also perpetuate poor working conditions and ill health.

Nutrition and Productivity

ix. Gender is a significant determinant of nutritional levels, accounting for lower caloric intakes and consequent poorer nutritional status among females. It is in the arena of nutrition that the "backward" linkage between women's health and productivity is most clearly manifest. Girls and women in low-income groups have worse nutritional status than boys and men. Although this may appear to contradict the evidence that female-male mortality differentials are higher among the better-off, the explanation lies in the different roles that social and economic factors play in determining malnutrition and mortality. Among the poor, resources such as food are limited, and females receive a smaller share than males. But as women have a relatively high economic value, they may be maintained above the survival line. Among the better-off, the inadequate resources do not constrain female survival as much as social devaluation. Thus, females are allowed to die, but the nutritional status of survivors is more equal to that of males.

x. Ultimately, nutritional discrimination against females results in their failure to achieve "genetic potential" in body size. This has serious implications for work performance as well as reproductive success. Continued restriction of food -- despite high energy expenditure on work and during pregnancy and lactation -- depletes women's physical resources; premature death ensues. The cycle of malnutrition envelops the next generation through low birth weight. The lower survival of offspring, in turn, encourages high fertility among women, with its consequent stress on the individual woman's and society's scarce resources.

xi. The effect of productivity on health is also manifest through a direct positive effect of women's wages on household nutrition. This relationship is mediated by factors such as wages, nature and seasonality of employment, women's household decisionmaking power, and the tradeoffs between women's work and child care. Efforts to increase women's labor-force participation can certainly help to improve nutritional levels among the most "vulnerable." The evidence suggests, however, that such efforts would be most effective if linked to provision of support facilities required for child care and to efforts to enhance women's access to health care.

Marriage and Fertility

xii. Issues of marriage and fertility are closely related to Indian women's health and productivity. Education and employment affect women's marriage patterns. Their low mean age at marriage (18.3 years) is both the effect of women's low social status -- low levels of schooling and "formal" employment -- and the cause of early and prolonged child-bearing. Lack of education and of formal work deprive women of health knowledge and access to incomes that could purchase better health goods and services. Childbearing can exacerbate ill health and place a great burden on women's physical resources and the economic resources of families.

xiii. A critical target group, adolescent girls, must be provided educational and vocational opportunities, and simultaneous preparation for marriage and motherhood. Almost half of all rural Indian girls in the 15-19 year age-group are married, as are 44 percent of all girls in this age-group. A delay in marriage could reduce the number of children and improve women's prospects of surviving maternal mortality, as well as contribute to the survival of infants, and to overall well-being of their families. Female education and female employment are two strategies to bring about delayed marriage. These strategies also influence fertility and infant mortality.

xiv. Early marriage and early childbearing have impact on both fertility and mortality. The risks of death are higher among young mothers and their offspring. Early motherhood results in inadequate growth, undernutrition, hypertension, and anemia. Girls who bear children before the close of the adolescent growth spurt may remain physically underdeveloped and hence at greater risk of obstetric complications, maternal death, and the birth of low weight infants. Low birth weight results in low infant survival. Ultimately, small mothers bear small babies who grow into small mothers -- if they survive.

xv. Clearly, Indian women's reproductive roles exercise a disproportionate influence on their health status and also on their productivity. In the presence of high levels of infection and malnutrition, childbearing is risk-laden. Frequent pregnancies leave little energy for work; they deplete body reserves drastically when work cannot be decreased. The demands of child care diminish female labor-force participation. Thus, the issues of women's health and of women's control over reproduction are intricately linked with women's social and economic status.

Access to Health Care

xvi. Women's access to health care is both the outcome of women's status in society and a determinant of women's health and productivity. The factors influencing access can be grouped into need, permission, ability, and availability. "Need" relates to female morbidity and mortality, while "permission" and "ability" refer to the social and economic boundaries of women seeking health care (i.e., demand). The "availability" of health services -- the supply -- is a fundamental constraint. Where these factors overlap, use of health services takes place.

xvii. Data on use of health services show that despite higher morbidity, women receive less health care than males. A smaller proportion of female illnesses are treated; treatment is lower quality, received late, and more frequently ineffective. Higher proportions of patients are male. Expenditure on female health care is thus less than that for males. There is "underutilization" of facilities meant specifically for women, such as antenatal care and delivery services. An analysis of factors influencing infant and child mortality reveals that the availability of health services and of trained birth attendants are the most significant determinants. While availability stimulates use of the services by women, female education and economic levels are important mediators in this process. In general, education and employment exert effects on women's "maternal competence" through mechanisms discussed in this report.

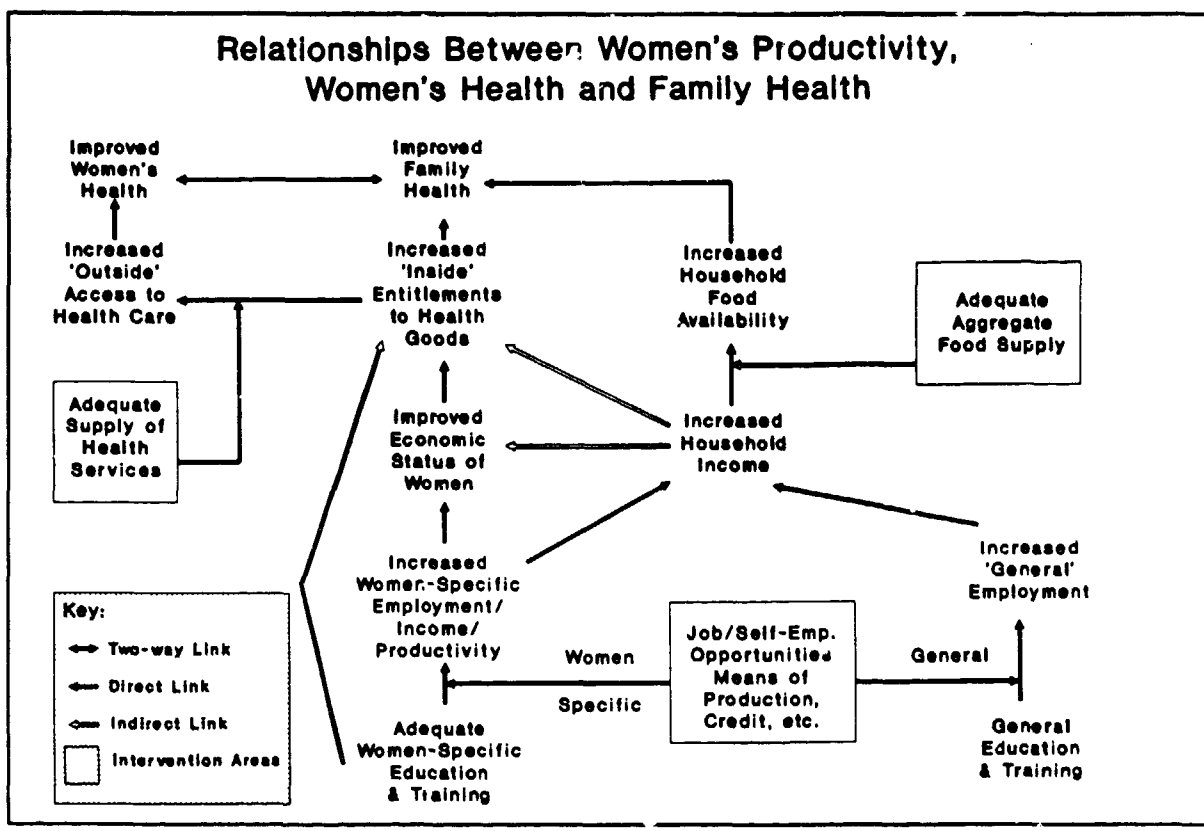
xviii. The health services available for women are described, along with "supplyside" impediments to women's access. Among these, the most important are the difficulties faced by the main "peripheral" female worker, the Auxiliary Nurse Midwife (ANM) or Multi-Purpose Worker Female (MPWF). Problems of training, deployment, supply, and social habit prevent ANMs, as well as Trained Dais and Anganwadi Workers, the village based health care workers, from reaching women in their homes. Support and supervision must be improved if women's health issues are to be addressed. The most important intervention aimed directly at women's health would be a program to shore up local health-service workers. A singular intervention would be iron-folate tablet distribution to women, for anemia control.

xix. In sum, attention must be paid to overcoming constraints to women's access to health care in the social arena, which restrict women from approaching health services; in the economic arena, which heighten the costs of seeking health care; and in the service arena, which restrict availability of health services. Together, health, nutrition, and family-planning services will improve the balance between the energy women obtain and the energy they expend in production and reproduction.

Chapter I: Introduction

1.1 The relationship between women's health and their (physical and economic) productivity is complex and multi-dimensional. It is characterized by 'flows' in both directions and a host of intervening factors. Two simple statements summarize the major directional flows: (a) women's health affects their productivity, and (b) productivity affects women's health. In the latter case, women's own productivity, that of their households, and even that of larger units such as the local, regional or national economy may be implicated. Women's health is intricately linked with family health, and their productivity with family productivity and related characteristics (see Figure 1).

Figure 1



1.2 This paper documents the nature of these relationships, using available data on Indian women which relate to a variety of health indices, and construing 'productivity' in the broadest possible way, including labor force participation, work output, income, and so on. The overall purpose is to discuss women's health within the context of the need to improve both women's productivity and welfare. Thus, women's health status, its determinants and consequences, are explored, leading ultimately to the identification of interventions required to improve it and thereby to improve women's productivity. The suggested interventions are viewed against the Bank's past and current efforts in the health (and nutrition) sectors in India and against current overall directions in Bank programming in these sectors; they may also signal possible new initiatives for Bank assistance for the development of women and health in the country.

PART A. Women's Health Status

Chapter II: Female and Male Mortality

A. Overview

2.1 Levels of health can be measured, in the first instance, by mortality indices such as the crude death rate (CDR), the infant mortality rate (IMR) or life expectation at birth (LEo). While the CDR measures mortality across a population as a whole, infant (and child) mortality rates point to premature deaths and are, thus, indicative of overall health conditions, including the availability and use of health services. The LEo sums the probability of survival across a lifetime, and age-specific death rates measure mortality risk at specific times in the life cycle. In addition to actual mortality rates, or levels, at specific points in time, trends in mortality are often instructive. In order to get specifically at the issue of women's health status, differentials between males and females in mortality levels and trends are most useful. Differences between regions or socio-economic groups help to identify both problem areas or groups as well as the social/environmental determinants of mortality, while differences among age groups may point to biological causes of death and also signal socially determined periods of stress in an individual's life.

2.2 While Sections B through D discuss what is known about female mortality in India with respect to these various indices and explanatory phenomena, the most important characteristics of female mortality can be listed as follows:

- Up to the age of 35 years, females have higher mortality rates than males; thereafter, they actually have lower mortality rates and, consequently, a longer life expectancy than males. This pattern appears to be directly related to the economic utility of women as perceived by their families. The strong cultural preference for sons (as breadwinners and old-age security for parents) and simultaneous bias against daughters (as a net economic drain on natal families because of the dowries they will take away at marriage) are reflected in lower female child survival rates. Better survival among 10-14 year old girls may be due to their higher "utility." The "key" to transition from high to low girl child survival appears to lie in the 5-9 year group. After the age of 15, women enter the period of risk -- with transfer from their natal to their marital homes and early, frequent and prolonged child-bearing, their reproductive role far over-shadowing any role they have in production. Neither in their natal nor in their marital homes is women's domestic work valued in terms of its economic contribution to the household. After the age of 35, as women begin to be freed from child-rearing responsibilities, their labor force participation increases and their economic contributions become more "visible."

- Among both males and females, 0-5 year olds have the highest mortality, and because of the large proportion of the population

in this age group, almost half of all deaths occur before the age of 5. As the male-female mortality differential is also high in this age group, it alone accounts for the major part of the deficit of females in the country.

- Over the past decade, females have caught up with males in average life expectancy, but the major gains have accrued to the older (over 35 years) rather than the younger age groups. The fact that younger females are worse off than both males and older females is reason enough for a special focus on young girls in health programming.

- States with the highest mortality levels have the greatest male-female differentials.

- Mortality rates for males and females in all age groups are consistently higher in rural than in urban areas.

- While regional and rural backwardness suggest that poorer socio-economic status is associated with lower survival of females, the relationship of female survival to socio-economic status at the household level appears to suggest that female survival chances are better among poor families. This paradox is perhaps explained by the economic value of women relative to men: it may be higher to individual poor families, but lower in regions where female labor force participation across socio-economic groups is low. Female survival is also mediated by prevailing social customs such as dowry payments which reflect and even worsen the low economic value of women.

B. Mortality Levels and Trends

Sex Ratio and Mortality

2.3 India is one of the few countries in the world where males outnumber females. This fact reflects India's unusual gender differential in mortality: i.e., higher female than male mortality. The 1981 Census counted 935 females for every 1,000 males -- giving a "female-male ratio" (FMR) of 935. As in other countries, the sex ratio at birth clearly favors males (FMR = 952). In most human populations throughout the world, this biological imbalance is eliminated by the age of 1 year through the higher mortality of male infants. In contrast, in India, while the expected pattern of higher male vulnerability during the neonatal period prevails, thereafter more female infants die so that the male and female infant mortality rates are equal (104 per 1,000 live births in 1984). However, as higher female mortality continues through the early childhood years, a much higher death rate obtains among 0-4 year old females than males (43.0 and 39.5, respectively, in 1984).

2.4 Table 1 shows age-specific mortality rates (ASDRs) by sex for five-year age groups (rural, urban and total), while Table 2 gives the female/male ratios computed from the ASDRs in Table 1 and rural/urban ratios

of the age-and-sex-specific mortality rates. While there is a sharp drop in mortality after the age of 5, female mortality remains between 25% and 40% higher than male mortality up to the age of 29 (in the "combined" group), is about 10% higher among 30-34 year olds, and finally drops below male mortality after age 35. Most of the deficit of females in the country is, thus, due to the higher female mortality up to age 35. There are particularly large differentials in the 0-4 and 15-29 year age groups, which are not offset entirely by the higher male mortality after age 35. The aggregate mortality rate (or crude death rate, CDR) for females, at 12.8 per 1,000 population, is 3% higher than that for males (12.4 per 1,000) -- but these rates disguise marked rural-urban differentials in addition to the age differentials depicted in Table 1.

2.5 The ASDR variations and differentials described above for the country as a whole are observed in rural and urban populations separately, despite considerably higher death rates among all groups in rural areas (see Table 2).

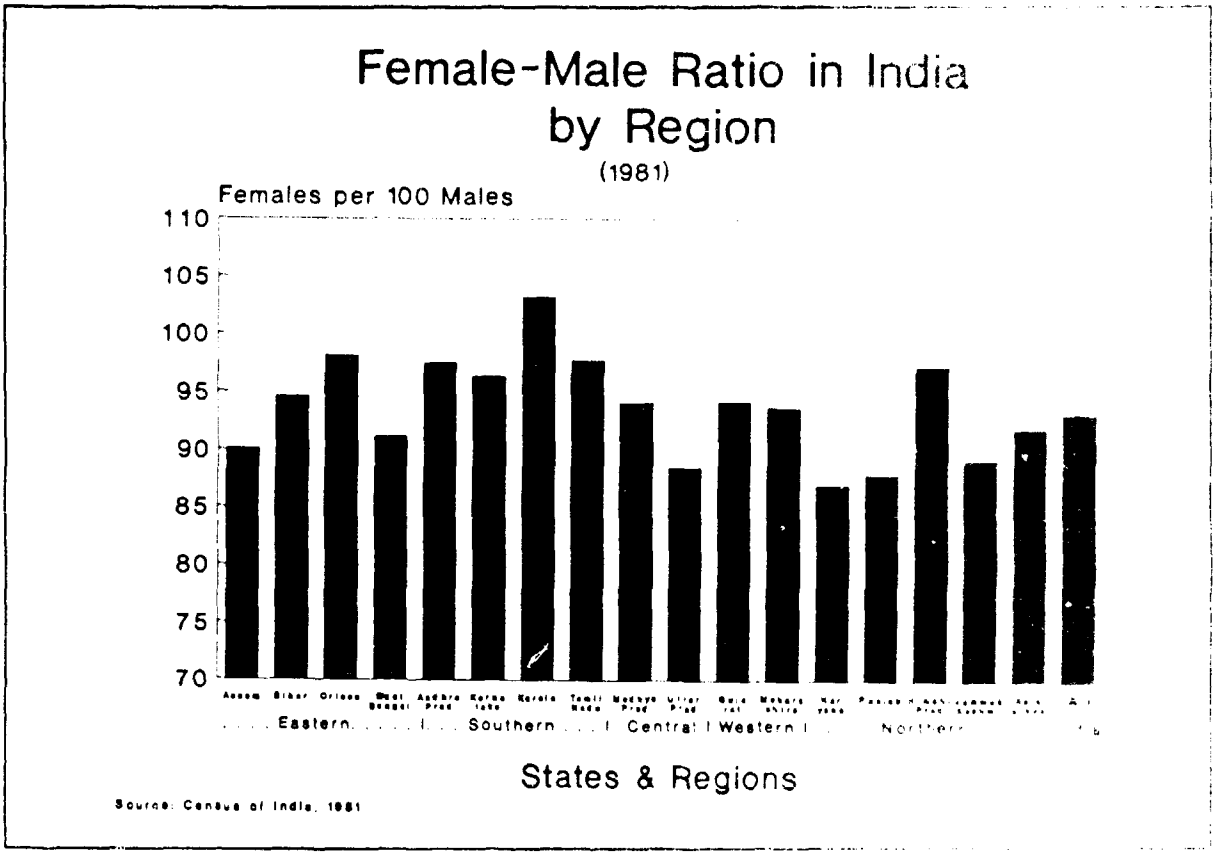
2.6 A point emerging from these age-and-sex-specific death rates which bears emphasis is that the gender gap in survival is greatest during the first five years of life when mortality is highest -- about 20 times greater than that of any other five-year age group (Table 3). The mortality rates experienced by this age group do not occur again until after the age of 65 for males and 70 for females, and such a wide gender differential obtains again only after age 50 when male mortality exceeds that of females.

2.7 A significant feature of Indian mortality is indeed that almost half of all deaths occur by the age of five -- specifically, 48.8% of female deaths and 45.3% of male deaths in 1978. Deaths of young girls in India exceed those of young boys by almost one third of a million every year. Every sixth infant death is specifically due to gender discrimination. Although experience in Sri Lanka (Langford, 1984) suggests that excess female mortality in this young age group may be especially intractable, prevention of these early deaths and of female deaths among them in particular is clearly crucial for the establishment of a more equitable sex ratio.

2.8 A significant demographic factor which is known to effect higher mortality among females in the early childhood years is birth order. A recent study in the Punjab recorded a female to male mortality ratio of 0.75 among 0-4 year olds in the case of first-born children (Das Gupta, 1987). The ratio rose dramatically to 1.23 for second children and doubled to 1.53 for fourth or later children. Even higher mortality rates were found among second-born girls if the first surviving child was already a girl. This indicates that the gender of existing siblings in a family is an important determinant of survival. These findings are especially significant in the light of the large proportion of high-order births occurring in the country.

2.9 Table 3 also lists the sex ratios prevailing in each five-year cohort, which can be taken as the summary outcome of all previous differential mortality experienced by each group. It can be seen that the sex ratio decreases continuously for the first three age groups, signifying an accumulating deficit of females up to the age of 15. It then swings upward

Figure 2



between 15 and 29 years of age, and declines again [illegible] differences cannot be accounted for either by age-[illegible] or under-enumeration. Significantly, the 15-29 year age [illegible] reproductive groups. Although the upswing in the sex ratio [illegible] to conflict with the continued higher mortality of female [illegible] at this stage of the life-cycle, it reflects the overall [illegible] survival that have occurred over time. Similarly, despite [illegible] current mortality rates for the age-groups over 30 years [illegible] sex ratios are a result of the greater differential that [illegible] male and female death rates in the past.

Regional Variations

2.10 The sex ratio varies markedly among states [illegible] and Appendix Table 1). At present, only Kerala has an [illegible] (1,032), and only five other major states have ratios over [illegible] Pradesh, Himachal Pradesh, Karnataka, Orissa, and Tamil Nadu. [illegible] Pradesh, male out-migration helps to improve the statistical [illegible] several major states, such as Assam, Rajasthan and West Bengal, outnumber females by almost 10%, and the situation is worst in Haryana, the Punjab, Jammu & Kashmir and Uttar Pradesh.

2.11 Although the 1981 Census data suggest that the historical decline in the all-India FMR (of approximately 6 females less per 1,000 males per decade) might have been arrested, the decline has continued in several states, including in the four states with the most 'favorable' sex ratios in the South. Even in Kerala, evidence of continuing decline is provided by the FMRs of the three youngest single-decade cohorts (0-9, 10-19, and 20-29 years) which are 967, 1,000 and 1,120, respectively. Out-migration of males explains part of this increase in the age-specific sex ratios -- but even if appropriate adjustments are made, the youngest group still has a lower (and 'deficient') FMR than the older cohorts.

2.12 However, some 'micro' regional and age-group improvements in the sex ratio are identified and discussed in Appendix A. These are largely the result of improvements in the socio-economic value of women in different areas and at different stages of the life-cycle.

Declining Mortality Trends

2.13 In general, the evidence suggests that as overall mortality levels decline, male mortality begins to exceed that of females. For example, in Kerala, which has the lowest mortality rates in the country, male mortality is higher than female mortality in all age groups. Another plausible trend, however, is that when female mortality declines, overall mortality declines disproportionately more, because of *a priori* higher female mortality (i.e., the contribution of male mortality decline to overall mortality decline is lower.)

2.14 Trends in mortality clearly indicate that over time there has been a progressive lowering of the age at which male mortality exceeds female mortality. However, this is currently at an age (35 years) when further reductions may be slowed, because of the component of maternal mortality suffered by females between 15 and 35 years (see below).

Life Expectancy

2.15 Until recently, the data unequivocally showed that women in India had a lower life expectancy than men. While overall mortality levels declined, pushing up life expectancy for both males and females, in relative terms women had fallen behind in their ability to survive. However, recent projections paint a more favorable picture for the future (see Table 4). In 1980, females were expected to live an average of 54.7 years, compared with 54.1 years for males. Within these country-wide estimates are hidden slight rural-urban differentials. While in urban areas, females outlive males from birth, in rural areas, males continue to outlive females from birth, but from age 5, female life expectation exceeds that of males.

2.16 However, "life expectancy" is a somewhat misleading indicator of female health status because it is the summary effect of mortality at all ages. The estimated longer life expectancy of females disguises their higher

mortality up to age 35 and lower mortality beyond that age. In fact, the higher female expectation of life is largely the result of greater survival among older women (compared with older men), which more than compensates (mathematically-speaking) for the lower survival of younger females. Differences between female and male longevity are especially great over 60 years of age.

Maternal Mortality

2.17 The relatively higher mortality among women aged 15-34 is summed in the simple statistic that while 8.4% of male deaths occur during these years, 11.7% of female deaths do (CBHI, 1976). In relative (rather than absolute) terms, excess female mortality is greatest during these reproductive years -- as much as 50% higher than male mortality (see Table 2).

2.18 A significant portion of these female deaths reflects women's reproductive burden (exacerbated by the burden of work, domestic and paid, and their concurrent poor nutrition, discussed below). It should be noted, however, that actual "maternal mortality" in India accounts for only about 2.5% of all female deaths (given the current crude birth rate of 33 per 1,000 population, a maternal mortality rate (MMR) of 460 per 100,000 live births, a population of 800 million, and a crude female death rate of 11.7 per 1,000).

2.19 Approximately 120,000 women die of a maternity-related cause every year in India. The WHO has estimated that about half a million maternal deaths occur worldwide every year, 99 percent of which are in developing countries, and over half of which are in South Asia (WHO, 1986). If India's maternal mortality rate were on par with that of a Western country, the figure would be only 2,400 for the entire population; and if both the maternal mortality and fertility rates in India were on par with the West, only 600 maternal deaths would occur annually. Thus, while the MMR is about 50 times higher in India than in developed countries, the actual risk of an Indian woman dying from a maternity-related cause is about 200 times higher due to her larger number of pregnancies (5 or 6, compared with 1 or 2 in developed countries). An estimated 15 percent of deaths among women in the reproductive age-group (15-44 years) are "maternal deaths" in India.

2.20 It is likely, however, that maternal deaths are under-reported, and the official MMR an underestimate. The incompleteness of vital registration in India, and unrepresentativeness of the national "Causes of Death" Survey (see below) contribute to this, although technical and social reasons also prevail. Micro studies often report considerably higher maternal mortality rates. For example, a recent community-based survey in a district of Andhra Pradesh found an MMR of 830 maternal deaths per 100,000 live births, and estimated that 36.4 percent of female deaths in the reproductive period had a maternity-related cause (Bhatia, 1986). The causes and correlates of maternal mortality are explored below in the section on women's access to health services. While the majority of maternal deaths are clearly preventable, maternal mortality is only a small aspect of the problem of preventable female deaths in India.

C. Socio-Economic Determinants of Mortality

2.21 Mortality data at the national and state levels are not available disaggregated by socio-economic levels, despite conventional wisdom relating death rates to levels of living. It is generally believed that "states with the highest estimated levels of mortality are also those where, by and large, other indicators of development and conditions of life tend to be below the national average" (Ruzicka, 1984: 24), while states with higher aggregate economic levels may not manifest lower mortality (e.g., Punjab and Haryana). Clearly, both "social" and "economic" factors are implicated in mortality levels and trends.

2.22 Female mortality appears to correlate inversely with female labor-force participation. The age-groups with the lowest mortality, i.e., those between 30 and 54 years, have the highest female labor-force participation (LFP) rates. On the one hand, both female survival and LFP may be positively influenced by the same factors. For example, lower fertility among 35-44 year old women results in lower mortality, particularly maternal mortality to which they would otherwise be especially susceptible on account of high parity and age. Lower fertility also enhances work participation, as women are freed from pregnancy and child care responsibilities.

2.23 On the other hand, female survival and labor force participation are also synergistic: survival influences participation rates, and high rates of female LFP enhance female survival, as regional analyses in India (and elsewhere) have deduced. Bardhan (1974) first hypothesized that demand for female labor in the rice-cultivating South supported higher female survival rates, compared with wheat cultivation in the North. For example, Miller (1981) analyzed sex differentials in mortality across the country, looking particularly at juvenile sex ratios (JSRs; i.e., FMRs of children under 10 years of age.) She found that northern districts, particularly in the North-West, had low JSRs, while southern districts had less biased ones or even female-favorable ones. She hypothesized that differences in the underlying discrimination against female children were related to differences in the 'economic value' of women in the different areas. Female-favorable district-level juvenile sex ratios in fact occurred where labor force participation (LFP) rates among 15-34 year old women were high.

2.24 However, in some areas where female LFP was low (such as in West Bengal, Assam, Orissa and Kerala), the JSRs were not necessarily unfavorable to females. These are areas where low levels of economic development generally suppress women's LFP, but where culture 'protects' females. In West Bengal, a strong inside-outside dichotomy may be at work: women participate less in work outside the household but are relatively protected inside it. Miller also found that where disparities in male/female participation rates were low, the JSRs favored females, but high disparities were not always accompanied by adverse sex ratios.

2.25 Further analysis in support of this hypothesis has been provided by Rosenzweig and Schultz (1982) (see Appendix B). In essence, where women's employment is high, female children receive a larger share of household

resources (relative to male children) than they do where women's employment is lower. According to these researchers, female employment is more significant than parental wealth or educational status in explaining variations in sex-specific child survival rates. Examining trends in female employment in different parts of the country, Agarwal (1986) has predicted further problems with female survival (see Appendix B for details).

2.26 Another 'economic' factor related to regional differences in female survival is the payment of dowry. A major expense incurred by girls' families, this practice is more prevalent in the North than in the South. Miller (1981) noted that high dowry and marriage costs were associated with adverse juvenile sex ratios, and low marriage costs with less adverse JSRs.

2.27 There is also an inverse correspondence between female labor force participation and dowry -- the lower the former, the higher the latter. Thus, in areas where female LFP is low, the "value" of the girl child is considered far below her "cost" in the form of dowry and marriage expenses that will be borne by her natal kin. Her unpaid domestic work is not considered in this calculation. In any case, any earnings she may have in adulthood would accrue to her marital kin. As exogamous marriages are the rule in these areas, the "net" value of women to society is considered less than their cost to their parental families.

2.28 These factors also explain to some degree the low 'value' attached to girls' education. Hence, low literacy and school enrollment rates prevail in the very areas where female survival and LFP are low, marriage costs high, and ea ` marriage and early childbearing the norms (see Chapter 4).

2.29 From the available evidence, it is unclear whether female survival is different among the poor and the "not-poor." Alice Clark's (1983) social-historical analysis of Gujarat suggested that female survival was lower among landholding groups because female infanticide was blatantly practiced to prevent land fragmentation. There is evidence that the persistence of female infanticide in small pockets of the country even today is related to the inability (or unwillingness) of families to accumulate (and part with) dowries for daughters, but as this appears to be true among both landed groups (such as the Rajputs in Rajasthan) as well as agricultural laborers (e.g., the Kallar community in Tamil Nadu), it does not help us get at the issue of differential female survival among the poor/not-poor.

2.30 Miller (1981) distinguished between "propertied" and "unpropertied" groups in the North and suggested greater discrimination against females among the better off largely because of the practice of hypergamy and high dowries. However, because of the intrusion of social factors (e.g., caste) in her analysis, the influence of the purely economic cannot be readily assessed. Furthermore, her distinction between propertied and unpropertied groups did not hold good for differential female survival in the South.

2.31 Adult females may also survive better among landless laborer families, as Krishnaji's (1987) analysis of data from the Rural Labour Enquiries suggests (see Appendix B). His findings are roughly consistent with

the theories that: (a) higher female survival obtains where the economic value of women, relative to men, is high, e.g., in laborer households, and (b) among the propertied, women are less valued and therefore fewer in number, because they take wealth out of the household in the form of dowries which may derive from land sales. Low adult FMRs may also be brought about in landed households by the presence of unmarried brothers who remain so specifically to prevent land fragmentation.

2.32 Similarly, from Census data, female:male ratios appear most favourable in the small landholding families and in the lowest expenditure classes, and least favourable among the best off (see Appendix B for details).

2.33 The most important conclusion from these findings is that where economic improvement is not accompanied by improvements in the specific economic 'value' (i.e., earning capacity) of women, it may have an unusually adverse effect on female survival, because the cost of daughters (i.e., dowry) goes up among the socio-economically better-off. What is important to ensure higher female survival is the actual economic contribution of women to household income, and not just labor force participation that may disguise underemployment or low wages. Female work must be "visible," sustained, and generate earnings equal to those of males. (This issue is also germane to the effects of women's work on overall child survival, discussed below.) Needless to say, economic advancement of women must go hand in hand with social development so that women do not simply become more valued commodities in a game of barter among families, as appears already to be the case among middle-class but tradition-steeped families.

Chapter III: Morbidity and Malnutrition

A. Introduction

3.1 The major explanations for higher, earlier female mortality are summed in the term "neglect," which covers a variety of prevalent and subtle forms of discrimination against girls and women in matters of feeding and health care. Although 0-5 year olds are biologically most vulnerable to this discrimination, it takes its toll on women throughout their lives. There is adequate evidence of high morbidity and malnutrition among girls and women. The discussion below is illustrative rather than exhaustive and focusses on establishing the nature and causes of female ill-health. Given the paucity of good-quality macro data on female-specific morbidity, or even on morbidity in general, it is not possible to establish the exact extent of many specific problems, although "ball-park" estimates are provided wherever available.

3.2 There clearly is a major need to undertake periodic national health surveys or even to establish a nationwide, community-based morbidity surveillance system. Accurate and timely information is required not only on the "major" diseases, but also on common problems which hamper people's normal functioning, and which may be the underlying causes of much mortality, especially among females.

3.3 Although mortality data are used most frequently as indicators of health because they are easier to obtain (and because death, as a 'final' event, is more easily measured) than data on illness or nutritional deficiency (which are based on subjective judgments), health efforts must nevertheless be addressed to the reduction of morbidity and malnutrition. Strategies aimed at preventing deaths may improve mortality indices, but they do not necessarily directly improve health conditions which are important determinants of productivity. Indeed, improved female productivity may be a better indicator of overall improvements in health than mortality decline alone.

B. Causes of Death

3.4 Cause of death information is available in India from medical certification of deaths in urban areas and from the "Causes of Death (Rural) Survey," a retrospective, lay-reporting survey carried out annually in a random sample of block-headquarter villages throughout the country. Although this survey may not be entirely representative and provides only a broad classification of causes, a general picture of the causes of mortality emerges. In 1986, "Senility" (i.e., old age), accounted for about 22% of deaths. The next major cause group was "Coughs and Disorders of the Respiratory System" (20%), which includes tuberculosis, asthma, bronchitis, pneumonia and whooping cough. In terms of importance, this was followed by "Causes Peculiar to Infancy," (among which "prematurity" is the most significant), "Fevers" (e.g., malaria, influenza and typhoid), "Diseases of the Circulatory System" (including anemia), "Other Clear Symptoms" (e.g., measles, polio, tetanus), and "Digestive Disorders" (such as gastro-enteritis, dysentery and ulcers). Each of these groups accounted for about 8-11% of deaths, "Accidents and Injuries" resulted in another 6-7%, and "Childbirth and

Pregnancy" caused around 1.1% of all deaths (Office of the Registrar General, 1988).

3.5 Although the pattern of causes of death appears roughly similar for males and females in different age groups (Appendix Table 3), some significant features may be pointed out:

- Although the pattern varies slightly among age-groups, the majority of deaths in every group are due to infectious and parasitic diseases, especially respiratory diseases.

- In the 5-14 year age-group, a significantly higher proportion of females than of males appears to die of coughs and respiratory disorders, while the reverse is true after the age of 25 years.

- Tuberculosis is the single most important communicable disease among both (adult) men and women, accounting for some 6% of all deaths reviewed by the rural survey and over 10% of medically-certified deaths in urban areas. Tuberculosis deaths occur more frequently among men. Dyson's (1984) suggestion that "excess" male mortality after 35 years of age may be due to a higher incidence of TB among men (than among women over 35) is corroborated by these data.

- Although the proportions of males and females dying due to a "disease of the circulatory system" are roughly equivalent, within this cause group most male deaths are specifically attributed to "heart attacks," while female deaths are largely ascribed to "anemia."

- In general, nutritional deficiency appears to underlie female deaths to a greater extent than male deaths.

- With increasing age, accidents and injuries gain in importance, and the proportion of deaths due to them has been increasing over time. In almost all age-groups, more males reportedly die of accidents and injuries than females.

- Above 15 years of age, causes related to pregnancy and child-birth are important among females, but the percentage of deaths caused by these conditions is small and appears to have remained constant over the past 14 years or so.

3.6 Different causes of death appear to predominate in different areas of the country. There are, for example, significant regional differences in deaths due to "coughs and disorders of the respiratory system." A higher proportion of deaths in Gujarat, Haryana, Jammu and Kashmir, Madhya Pradesh, Rajasthan, Uttar Pradesh and West Bengal are in this category, while in the southern states of Andhra Pradesh, Karnataka, Tamil Nadu and Kerala, and in Orissa in the East, the proportion is much lower.

3.7 As this classification accounts for the largest portion of

non-old-age deaths among females, it may not be simply coincidence that the regional pattern (which could be dismissed as being due to climatic differences) corresponds to the North-South dichotomy observed in female mortality. Women may be more susceptible directly to adverse climate because of inadequate clothing to stave off cold during outdoor chores such as fetching water or gathering fuel early mornings; or they may be more susceptible indirectly due to underlying conditions such as anemia or malnutrition, which are greater where they are less valued culturally (i.e., the North, as discussed earlier.) Both women's seclusion and cold climate (and, of course, women's domestic role) would act to 'closet' women in smoky kitchens, making them vulnerable to respiratory disorders such as bronchitis, pneumonia, tuberculosis and asthma (see the Section on Occupational Health Hazards, below).

C. Morbidity

3.8 In addition to these national data on fatal disease episodes, micro-level studies add to our understanding of morbidity. For example, a study of rural children under 10 in Tamil Nadu showed considerably higher morbidity among girls, especially with those conditions known to be 'major causes of death', such as respiratory infections, in contrast with less insidious conditions, which were more prevalent among boys (see Table 5). Other studies support this general finding with respect to diarrhoeal diseases -- which are often acutely fatal among young children (Cohen, 1987; Pettigrew, 1987; Levinson, 1974).

3.9 A national survey of disabilities found that prevalence rates of visual disabilities were 45-50% higher among females than among males, while males suffered more often from hearing, speech and locomotor problems (National Sample Survey Organisation, 1983). The extent of visual impairment was greatest among females over 40 years, and the female-male differential was also highest after this age. Among women, hearing and locomotor disabilities also increased with age (as one would expect), but speech defects were greatest among 5-14 year olds.

3.10 There are few studies that compare the health of women and men in the same household, but those that exist generally report a higher prevalence of illness among women (e.g., Khan et al., 1983; Jesudason and Chatterjee, 1979). One study followed 110 families over a two-year period and found a significant difference in the number of illnesses suffered by "mothers" (10.8 episodes per year) compared with "fathers" (6.0 per year) (Kamath et al., 1969). Unfortunately, this study did not disaggregate data on children under 10 and other household members; had it been done, the male/female differential might have been larger. However, other researchers have failed to find a gender difference in the incidence of disease (e.g., Chen et al., 1981) and have suggested that higher female mortality is more the result of a lack of treatment of female illnesses (see below).

3.11 Mention must be made briefly of some social health issues which though important to women's health conspicuously lack the support of data. The problem of infertility is apparently considerable and is of grave

significance at the individual level because of the emphasis placed in Indian society on women's role as mothers.

3.12 In another category are crimes against women which rebound on their health -- rape, bride-burning, wife-beating and widow-burning (sati). Bride-burning has attracted attention recently because of its emergence as a middle-class phenomenon -- but, along with other forms of physical abuse against women, it may be common among the poor as well. Whether accidental or intentional, burns are a major category of hospital admission cases in urban hospitals (Karkal, 1985). Wife-beating is not uncommon among poor families due to high levels of alcoholism. Prostitution, too, can be perceived as a problem affecting poor women as it constitutes a form of debt repayment, for example, among bonded labor households. More often than not, the income earned accrues directly to the men involved (husbands, landlords, brothel owners) while the women are left to deal with the concomitant mental and physical health problems, commonly including venereal diseases.

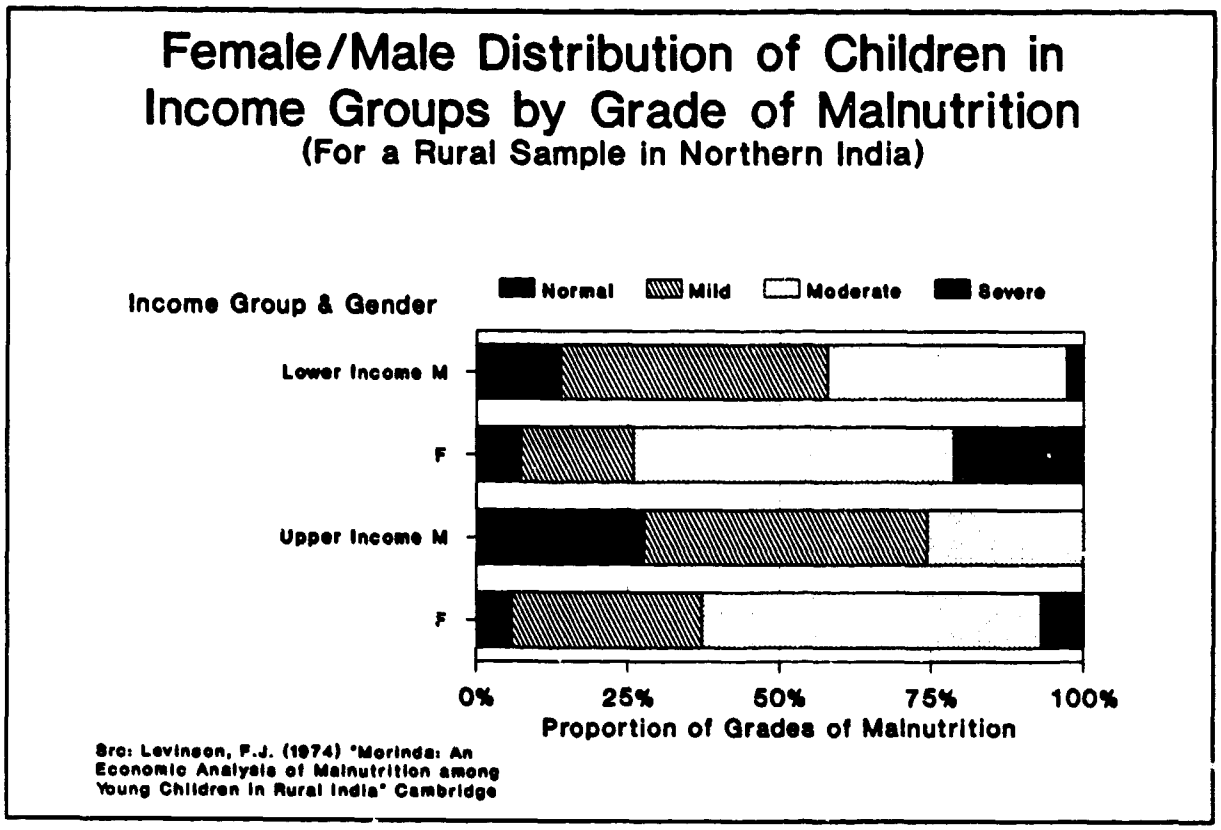
D. Nutritional Status

3.13 In general, micro-level studies find higher rates of malnutrition among women and girls than among men and boys in the same age groups. In fact, an early study in Morinda, Punjab, showed gender to be the most significant determinant of nutritional status (measured by anthropometry) (Levinson, 1974). It also accounted for variations in caloric intake for the population as a whole, (and in diarrhoeal infection, as mentioned above, particularly among upper-caste Jat families.) However, the effects of gender on nutritional status were stronger than its combined effects on dietary intake and infectious diseases. As have other authors concerned with male/female differentials in nutrition in the Punjab (e.g., Wyon and Gordon, 1971; Kielmann et al., 1981; Das Gupta, 1987), Levinson attributed this to differentials in the care and upbringing of sons and daughters: "An economic as well as cultural premium (is) placed on living sons ... (while) daughters are considered unproductive and an expensive economic drain, particularly the cost of dowry when they marry."

3.14 Socio-economic factors are important in determining actual nutritional status as well as male-female differentials (See figure 3, following page). For example, caste has been found to be significant in Punjab (Kielmann et al., 1981; Levinson, 1974). The most serious male-female differences occurred among the lowest income group that Levinson studied, the Ramdasias (Harijans). Among them, according to Levinson, resource and time constraints were greatest, so that "unwanted" daughters were neglected. Among some of the upper-income Jat families, who did not face resource constraints, young girls were better cared for. Both Jat and Ramdasia mothers breastfed their male children longer to increase their survival and well-being. In addition, Ramdasia daughters were significantly deprived of other food, while among Jat families female children consumed as much as males on the whole.

3.15 The finding that girls in low-income groups have worse nutritional status relative to boys than those in higher-income families would appear to contradict the earlier discussion of apparently higher female mortality among

Figure 3



the better-off. This divergence may be explained, however, by the different weights of economic and social factors in malnutrition and mortality. Where resources (e.g., food) are limited, females receive a lesser share than males, with greater consequences on nutritional status, but because females are perceived to have an 'economic value' among the poor, they may be maintained above the 'survival line.' Among the better-off, the social devaluation of females (and their 'net negative' value due to high dowry payments) results in their being 'allowed' to die, even though resources may not be a constraint and therefore may not result in inferior nutritional status. The divergence also suggests that higher female mortality among the better-off may not be mediated by nutritional status.

3.16 Discrimination against females in matters of feeding already has visible effects on nutritional status in infancy (even among urban populations), as shown in Table 6. These effects persist through childhood (see Table 7). Other studies, such as a major longitudinal study of a birth cohort at Safdarjung Hospital in Delhi, confirm the picture of deterioration in nutritional status as the female grows older. The last row in Table 7 shows the sex distribution of children in each grade of malnutrition in a study of the Punjab in 1974 (CARE, 1974): only 3 out of 10 'normal' children were girls, but over 7 of 10 severely malnourished children were female. (See figures 4 and 5, following page.)

Figure 4

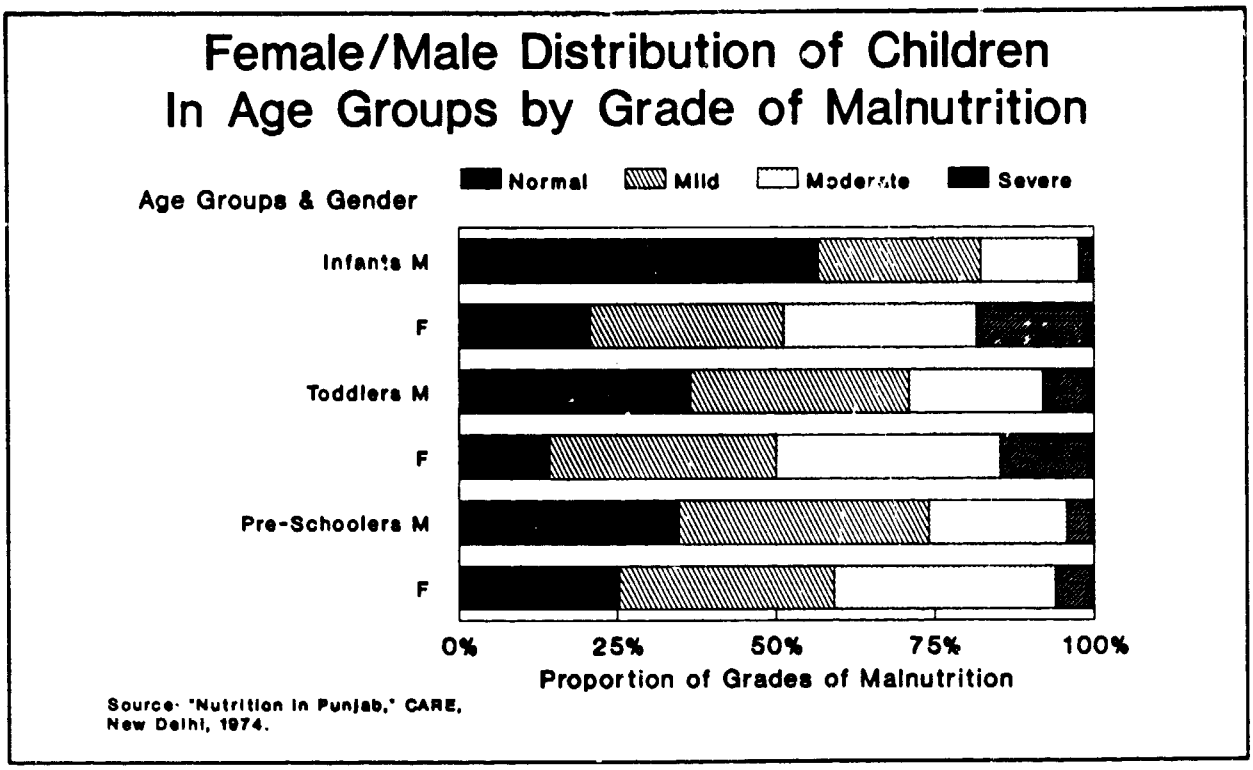
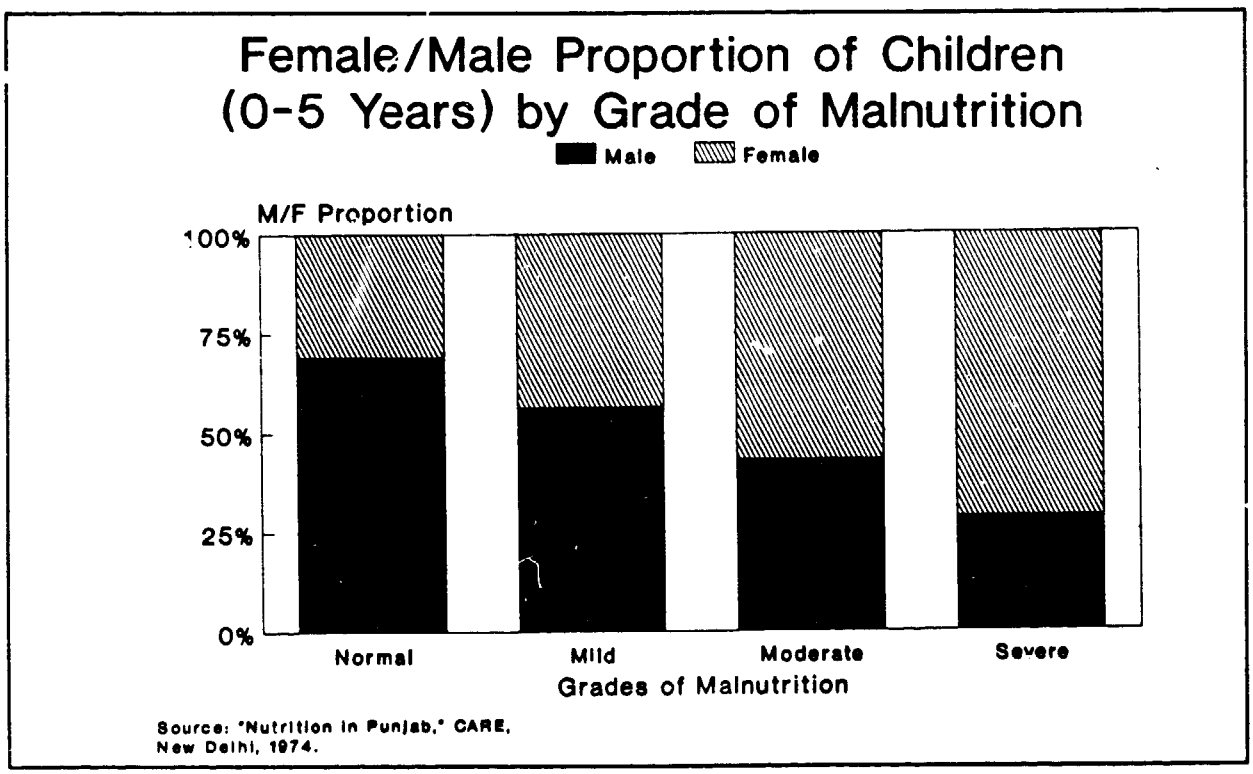


Figure 5



3.17 The sex differential in nutritional status among the poor is illustrated in Table 8. That economic development and agricultural growth have had little positive impact on the situation faced by young girls is demonstrated by a comparison of data from the Punjab in the early 1970s and more recent evidence. Das et al. (1982) compared 'privileged' and 'underprivileged' males and females and found that 24% of females were malnourished in the privileged group, but 74% among the underprivileged. The percentages for males were lower in both cases -- 14% among the privileged and 67% in the underprivileged.

3.18 In times of economic crisis, girls also suffer malnutrition -- and death -- more frequently than boys, as Bairagi demonstrated for Bangladesh (Bairagi, 1986). A nutrition survey of flood-affected West Bengal villages in 1978 showed a higher incidence of malnutrition among girls under 6 years of age. The female/male ratio of malnourished 0-5 year-olds was 1.07 (Kynch and Sen, 1983). If only moderate and severe malnutrition were considered, the ratio rose to 1.40; and it was 1.59 among severely malnourished children alone. These data illustrate that not only are females more likely to suffer from malnutrition, but that when they do the severity of their malnourishment is greater. They also point to the synergistic effect of impoverishment and gender bias on nutritional status.

3.19 However, sex differences in nutrition are not confined to poor households. Das Gupta (1987) found a higher sex differential in food consumption of 0-4 year olds among landed families than among the landless in some Punjabi villages. Some insight into this process is provided by a study by Sen and Sengupta (1983) which compares two villages in West Bengal. In both villages girls were more frequently and severely malnourished than boys in landless households than among the landed: the ratios of female to male under-nourishment in the two groups were 1.7 and 1.3, respectively. Following land reforms in one village, the percentage of the population owning land increased and under-nourishment among 0-5 year olds decreased. However, despite its better overall nutritional status, this village showed sharper sex differentials: only boys' nutritional status improved, while the nutritional levels of girls remained the same in the two villages. The economic benefits had accrued selectively to boys. In this experience, a nutritional feeding program helped to overcome the sex bias in nutrition to some extent.

3.20 Macro-level surveys conducted by the National Nutrition Monitoring Bureau suggest somewhat better nutritional status among girls than boys. In 1980, 51% of girls suffered from mild malnutrition, compared with 44% of boys, but the frequencies for moderate and severe malnutrition were: 25% of girls and 39% of boys, and 3% of girls and 6% of boys, respectively. This pattern persisted in all the eight major states surveyed in that year (Appendix Table 4). One possible explanation for the conflict between these national survey data and micro studies is that while the former pool information on different socio-economic groups, micro studies may be skewed toward poorer groups which have higher overall rates of malnutrition and, thus, also greater sex differentials.

E. Dietary Intake

3.21 Lower nutritional status among females is due both to the greater morbidity they experience and to more inadequate dietary intakes. Within the household, food is distributed more in accordance with an individual's status than with nutritional requirements. Throughout their life cycles, females receive less food (relative to their requirements) than do males, and also "inferior quality" foods.

3.22 Starting with feeds at her mother's breast, a young girl receives less milk, less frequently and for a shorter period (Ghosh, 1987; Khan et al., 1983). Das et al. (1982) reported that this is especially detrimental to girl children born into families who already have a surviving child, particularly among low socio-economic groups. This is supported by Das Gupta (1987) who showed greater risk of mortality among girls of high birth order. According to a study by McNeill (1984), in Tamil Nadu a male child was breastfed on an average for five months more than a female child, and a male child in a landed family almost ten months longer than a female child in an agricultural laborer's household.

3.23 Another effect of the shorter period of breastfeeding of girl children is the earlier onset of ovulation and, thus, the possibility of subsequent conception by their mothers. The resultant shorter birth intervals after female births compared with male births (documented, for example, by Halder and Bhattacharya (1969) in an analysis of NSS data) increase the risks of malnutrition and mortality among female children, and also contribute to "maternal (nutritional) depletion."

3.24 Although weaned earlier, young girls may not get the required quantities of supplementary foods, which also predisposes them to higher rates of malnutrition. The study of rural Tamilian children cited earlier (Devadas and Kamalanathan, 1985) clearly showed the discrimination against females (see Table 9). Although both boys and girls received inadequate food compared with the ICMR recommended daily allowances, girls were worse of, leading to subsequent lower weights and heights. Younger children received substantially lower proportions of the recommended intakes than older ones, but gender discrimination increased with age. Here, as in the Punjab, boys received higher quality foods. Das Gupta (1987) reported that males received more cereals, fats, milk, sugar and total calories than females in the 0-4 year age group. The higher intake of calories and proteins by males of all ages has also been documented by studies in Bangladesh (Chen et al., 1981).

3.25 In their detailed study of an Andhra village, Bidinger et al. (1986) found that children under 6 years of age had severely inadequate energy intakes, with those between 6 months and 2 years of age most deficient, followed by 2-3 year olds. Half of all children under 3 received less than half of their recommended intake, and females in the second year of life were particularly affected. Male children fared better than females from the age of one up to age 12, beyond which adolescent girls met their full requirement, in contrast with boys who were still nutritionally deprived. However, in adulthood (19-40 years), although women were only marginally deficient with regard to requirements, they received somewhat less than males. These

individual differences occurred despite near-adequacy of food availability at the household level.

3.26 In this study, as elsewhere, the low dietary intakes of children were reflected in their weight deficits, with females faring worse than males, and discernible worsening trends for both sexes between the age of 5 months and 3 years. Weight-height differences for males and females were also pronounced in the first three years of life.

3.27 An analysis of 24 household surveys of dietary intake in the Subcontinent provides insights into male:female differentials by age, among different socio-economic groups, in different regions, and in different seasons (Harriss, 1986; see Appendix C for details.) On the whole, the studies support the conclusion that female nutritional 'equity' improves from North to South in the country. In the East, nutritional deprivation of females is economically rather than culturally mediated, and work (i.e., energy output) plays a significant role in female undernutrition. Carloni's (1982) work in Bangladesh found that adult women consumed only 1600 calories per day on average, which was 30% less that the consumption of adult males of the same age group, and 33% less than their requirement. These findings fit well with the explanation for 'higher female mortality despite higher female workforce participation' discussed in the section on regional differences in mortality.

3.28 Another major source of dietary intake data is the National Nutrition Monitoring Bureau (NNMB). The NNMB data show considerable variation among states in the proportion of households with adequate calories or protein available (see Table 10; NNMB, 1984). However, a regional pattern is difficult to discern. In 1982, as in previous years, Karnataka had the lowest percentage of households with inadequate calories (19.3%) and Tamil Nadu the highest (64%). If the data from all states are pooled, 48.5% of households did not have adequate calories available. This figure lies between the percentage of households in the sample which had per capita incomes of less than Rs. 1 or Rs. 2 per day (29% and 61.5%, respectively), although there need not be a one-to-one correspondence between the lowest income households and calorie inadequate households.

3.29 In general, the NNMB data display lower food consumption:

- in households without land, compared with landowning households;

- among those who possessed land but did not grow crops in the reference year, compared with those who did grow crops;

- among laborers and "others" (e.g., village artisans and petty businessmen), compared with cultivators; and

- among Scheduled Castes and Tribes, compared with non-scheduled groups (Appendix Table 5).

3.30 At the individual level, among persons surveyed, between 22% (in Karnataka) and 51% (in West Bengal) did not have adequate calories (see Table

10). In most states (except Karnataka and West Bengal), the percentage of individuals with inadequate calorie consumption is considerably lower than that of households. This suggests that the burden of deficit falls disproportionately on some individuals.

3.31 However, on the whole, the NNMB data do not show that females are worse off than males. The only exceptions are lactating women, whose diets are highly inadequate judging by both calorie adequacy measurements and percentile values of intakes expressed as percentages of recommended intakes. This source appears equivocal even about the dietary intakes of 1-5 year old girls, despite their worse anthropometric status relative to boys. On the other hand, in contrast with micro-studies which find the smallest male-female differentials among adolescents, the NNMB data on dietary consumption among girls in the 13 to 16 year age group indicate that they consume much less than boys and only two-thirds of the recommended calorie intake in all states surveyed except Karnataka. While 16-18 year olds appear to fare slightly better, they are still below requirement in all states (Appendix Table 6).

F. Micro-Nutrient Deficiencies

3.32 The higher incidence and magnitude of malnutrition among preschool girls despite relative equality with boys in caloric intake suggests that a greater disease burden (through neglect of illness) may be the critical difference. However, low intakes of micro-nutrients such as vitamin A and iron are well-documented among preschool and adolescent girls.

3.33 In Harriss' (1986) collection of dietary surveys, the studies conducted in Maharashtra and Andhra Pradesh highlight the importance of vitamin A deficiency. Harriss suggests that households in the South have low absolute levels of this nutrient available, but share it more equitably than in the North where children of both sexes, adolescent girls and adult women receive low shares. (These groups are similarly deprived of other micro-nutrients such as vitamins B and C.)

3.34 Three of the studies analysed by Harriss (1986) show evidence of deficiencies in iron and calcium among adolescent girls, adult women (especially pregnant and lactating women) and children (particularly girls), in order of decreasing importance. With the onset of menarche, young girls are highly susceptible to anemia in the absence of adequate compensatory dietary iron. Indeed, the prevalence of anemia among women and children in India is extremely high. A study conducted in four areas of the country under the auspices of the Indian Council of Medical Research found that over 95% of girls aged 6-14 years in the Calcutta area were anemic, around 70% in the Hyderabad and Delhi areas, and about 20% around Madras (see Table 11; ICMR, 1982). Similar percentages were found among older women. While the range of variation is difficult to explain, anemia is clearly an important health problem of women from an early age. It hampers female energy for work and increases susceptibility to disease.

3.35 In the country as a whole, 50-60% of all women are estimated to be

anemic at the time of pregnancy. Anemia both complicates pregnancies and is exacerbated by them. It is a major cause of low birth weight, and accounts for 20-25% of maternal deaths (see Table 11, and further discussion below).

G. Female Nutrition and Low Birth Weight

3.36 Anthropometric data from the NNMB also suggest that females are no worse off than males, except among pre-school children. In this group, female weights-for-height are particularly low in Tamil Nadu, West Bengal and Uttar Pradesh (of the eight states surveyed). However, the height and weight data do show that many women never realise their full growth potential, remaining stunted or wasted due to malnutrition (NNMB, 1980). For example, among 20-24 year olds, between 12% and 33% of the women in each of the states surveyed had heights below 145 cm, and between 15% and 29% weighed less than 38 kg. These heights and weights are considered 'cut off points' below which women are at very high risk of obstetric complications or of delivering low-weight babies. Of course, these percentages are higher among younger women (e.g., 49% under-height and 67% underweight among 15 year olds in Kerala) (Gopalan, 1986) who have not yet completed their adolescent growth spurt -- but who may yet marry and bear children at this early age.

3.37 Poverty exacerbates the problem of low birth weight among children born to women of low height. Ghosh et al. (1982) found a 35.5% incidence of low birth weight among babies born to poor, short women, compared with 24% among those born to poor women over 145 cm and 15% among the babies of better-off, taller women.

3.38 Rather than being increased in accordance with the additional caloric demands of pregnancy, a pregnant woman's food intake may be further restricted. Cultural taboos bar specific foods believed to be undesirable for mother or child. The fear that a large fetus may cause difficult or prolonged labor is common. The daily caloric gap of pregnant women may average 500-600 calories (i.e., 25-35% of requirement). Maternal nutritional depletion is a serious consequence of repeated pregnancies (and lactation periods) with inadequate dietary intakes. There are also possible fatal consequences for the child. Lactation is also an energy-draining process. While prolonged breastfeeding may be beneficial to infants and toddlers, the low-income mother remains at nutritional risk.

3.39 In sum, malnutrition begins early in female life, initiating a vicious cycle through adulthood and into the next generation. Early adolescence provides an opportunity to compensate for young child malnutrition. Studies have shown that stunted and malnourished children can catch up in growth if they are fed adequately at this time. Thus, the adolescent age-group deserves attention to its health and nutrition, comparable to that being accorded to preschool children and pregnant/lactating women (see section on Health Services). The adolescent years are also crucial to preparation for adult roles as earners and child-bearers/minders, and thereby to establishing women's productivity (see section on Marriage and Fertility).

3.40 On an average, almost 16 years of a woman's life may be spent in pregnancy and lactation, coinciding with the years of women's maximum work burden in domestic and possibly paid work. Complications during pregnancy, premature births and low birth weight babies with low chances of survival or development result when a mother is undernourished from her youth. A high percentage of deaths among women during pregnancy and child-birth have anemia as a direct cause and may have early malnutrition (resulting in low height or weight) as a major underlying cause. In addition, the high mortality of children born to malnourished mothers encourages high fertility with its consequent stress on the individual mother's (and society's) scarce resources.

Chapter IV: Women's Work and Health

A. Introduction

4.1 Women's work and health are related in a number of ways. First, the energy costs of work have implications for the nutritional status of workers. In the context of economically and socially-mediated nutritional deprivation, women's energy output for work may exacerbate their poor nutritional status. This may increase their morbidity and, ultimately, result in "premature" mortality. In addition, the work itself may have health hazards associated with it. Conversely, women's work may be negatively affected by undernourishment or illness. These relationships are explored in sections B to D of this chapter.

4.2 Secondly, women's work may affect the health of other household members, particularly children. This too may be negative or positive. Heavy work demands on pregnant women affect the birth weights and viability of their infants. A busy, working mother may feed her infant or young child less, or be unable to give children the care they require during illness. On the other hand, a major reason for women working in traditional and poor societies, one assumes, is that it affords a higher level of economic well-being to the family, which in turn brings about better health. As a result of greater awareness or access to information or community services, working women may also, indirectly, improve health or nutrition practices within their households. The remaining sections of this chapter will analyse what is known of these complex interactions, using the little information available in India and extrapolating from studies in other countries.

B. Nutritional Energy for Work

4.3 As discussed in Chapter III, the evidence that women receive a smaller share of household food is compelling. At the same time, they may undertake a disproportionately greater share of total household work, i.e., household economic work and domestic work combined. Thus, given the low caloric intakes discussed above, another factor exacerbating female malnutrition is high energy output. Anecdotal evidence and a few studies (e.g., Jain and Chand, 1982; Batliwala, 1982; Khan et al., 1983) suggest that women in India work longer hours in paid plus unpaid/domestic work than men. Batliwala (1982) estimated that women had a shortfall of 100 calories a day, and men a surplus of 800 calories daily on an average in 560 households in six Karnataka villages, if one included women's domestic work in the physical activity calculations.

4.4 In fact, the energy demands of domestic work may partly explain even young girls' lower nutritional status, despite apparently equitable food intakes. By the age of 5 years, many girls are already undertaking arduous tasks such as fetching water, collecting fuel and fodder, tending cattle, sweeping, or managing younger siblings. Very often, they are also involved in home-based industry (such as carpet-weaving or bidi-rolling) or in agricultural operations outside the home. Yet, according to the National Nutrition Monitoring Bureau (1981), only half of all children between 5 and 15

years of age receive adequate nutrition.

4.5 By the age of 10-12 years, girls may be working 8 hours a day, and by age 15, 10 hours or more on household and productive work. In general, girls work longer hours than boys of the same age. As one goes down the economic ladder, the work burden increases for both girls and boys (Cain, 1982; Rosenzweig, 1980; Acharya and Bennett, 1981). In contrast with the greater number of working hours put in by girls, boys contribute more to household income because they engage more in wage work or receive higher wages (Rosenzweig, 1980). This results in girls' work being undervalued, so that their energy output is not adequately covered by intake which, as discussed above, is accorded preferentially to boys.

4.6 The energy input-output imbalance may be even more serious for young girls in poor households. An all-India study of 4,000 rural households showed that the proportion of working 10-14 year-old girls was 4-5 times greater in landless households than among land-holding households, and they also worked four times as many days (Rosenzweig, 1980).

4.7 Work participation rates clearly depend on the employment opportunities available. A study in Rajasthan found that girls between 9 and 19 worked much longer hours at agricultural and animal husbandry tasks than boys of the same age, but they worked less than boys in non-agricultural labor (Jain and Chand, 1979). This contrasted with the situation in West Bengal where there were more non-agricultural work opportunities for girls. This study also showed that girls from landless families in West Bengal were engaged more often in economically gainful activity than those from landholding households, while the opposite was true in Rajasthan. The wide variations in work patterns of young girls across regions, by socio-economic levels, and so on, can also greatly influence their nutritional status.

C. Effects of Health on Work

4.8 Ill-health, malnutrition and disability affect work in a number of ways. They can prevent participation in the labor force altogether, as, for example, in the case of many disabled persons. Alternatively, they can force temporary absences from work - during illness, while seeking health care, or, as is often the case with women, during the provision of illness-care to others. They may also reduce productivity - by reducing the returns per unit of work effort or, conversely, raising the effort price of labour.

4.9 Ill-health and malnutrition form a vicious cycle with poverty, with low-income families being more susceptible to disease, which in turn reduces work participation and hence income. While illness is a major cause of indebtedness among the rural poor, (second only to marriage payments), who borrow from money-lenders in the case of a major illness requiring expensive treatment or hospitalisation, more subtle are the effects of ill-health which result in the loss of daily wages among those who are unable to work from time to time. The National Sample Survey (1977-78) reported that days of abstention from casual work due to sickness amounted to 5.3% of employed days for rural men and 6.0% for rural women (Lipton, 1983). In the case of men 30%

more absenteeism was reported in the July-September period than in April-June, but the seasonal variation was less in the case of women. Regional variation was considerable, 'days lost' amounting to 15% in Kerala, but only 4% in West Bengal. Although Lipton suggests that the greater availability of health services in Kerala may explain the withdrawal from work of the sick who can seek health care, low levels of nutrition among agricultural labourers may be a more important explanatory factor for the sickness per se and thereby the high rates of absenteeism.

4.10 Non-participation due to illness alone of casual workers accounted for 14% of the "downtime" due to unemployment of the entire rural male workforce, although casuals comprised only 22% of the workforce. For females the corresponding figures were 18.6% and 32.3%. Lipton argues that withdrawal from work due to illness is widespread, and notes a correspondence between work availability and illness. The poor and women usually work more in peak work seasons. However, illness also peaks at these times so that non-participation is highest when the most work is available. He concludes that better health would increase labor supply, that such supply would find work and raise not just its own but total labor-income, and enhance GNP. This is a powerful argument for health interventions to reduce the incidence of general (non-life-threatening) morbidity among the rural poor.

4.11 In a study of six villages in Andhra Pradesh, female labor force participation was reduced by 22% by disability. Using data from this study, Deolalikar (1984) demonstrated the connection between health outcomes and labor productivity. He contends that while "long-run" or "cumulative" measures of health, such as height, are not important in determining labor productivity, "short-run" or "transitory" health, demonstrated in weight-for-height, influences the marginal productivity of labor. He found that the increase in agricultural wages due to increased weight/height was enough to justify investment in nutrition, improving the general health environment, and reducing the incidence of diseases. Although Deolalikar found that the predominant determinant of wage rates was gender (men received 50% higher wages than women, all other factors held constant), he did not draw separate conclusions for men and women, which suggests that his findings are equally applicable.

4.12 There are virtually no good quality studies in India on the impact of ill-health or malnutrition on work capacity. Impact is difficult to investigate as it often requires meticulous measurements of metabolic phenomena and control of extraneous factors. Similarly, although attempts have been made to document increases in worker productivity as a result of health improvements, such as hookworm control or anemia prophylaxis, more rigourous approaches are called for. Even less is known in India on the effects of the incidence of malnutrition and disease on the structure and composition of the work force, particularly with respect to women, although Lipton's analysis has provided some helpful clues.

4.13 Another way in which ill health and malnutrition affect work participation - in this case, specifically of women - is through their ultimate manifestation, mortality. High mortality in India, particularly child mortality, increases fertility. The indirect effects of repeated pregnancies,

in the context of malnutrition and morbidity, on women's capacity for work (e.g., the effects of anemia) have been discussed above, but there are also direct negative effects of pregnancy on female participation in economic activity. High maternal mortality also, obviously, affects the structure/composition of the workforce.

4.14 There are compelling reasons to believe that ill health and malnutrition are more likely to affect women's work participation than men's. Firstly, women are more likely to be ill or malnourished than men, as discussed in Chapter III. Second, male heads of household not only receive the "lion's share" of food, but among families who are more dependent on their wages, they are less likely to absent themselves from work. Third, because women's wages are generally lower than men's, the opportunity costs of women's abstention from work are lower, increasing the likelihood that women will stay home from work during their own illnesses as well as to care for other ill members of their households, particularly children. Finally, as noted above, women are repeatedly pregnant. This in turn leads employers to discriminate against them while recruiting workers, and pay them lower wages. This is true of both informal and formal sectors as, in the latter, employers are legally bound to provide maternity benefits (see below).

D. Occupational Health Problems

4.15 Among the negative effects of women's work (both economic and unpaid/domestic) on health are occupational diseases and problems to which they are susceptible. Unfortunately, quantitative information on women's occupational health problems is sparse, what is available being largely descriptive. As an estimated 90% of women workers in India are in the unorganized sector, in a large number of occupations, it is virtually impossible to glean adequately representative information on their varied working conditions and occupational diseases. However, a few studies and the recent report of the Task Force on Health of the National Commission on Self-Employed Women (1988) provide some information.

4.16 The largest proportion of women work in agriculture, primarily as labourers, where they are exposed to health hazards, such as poisoning from pesticides and chemical fertilisers, which can cause diseases of the liver or nervous system, cancer, blindness or deformities. Abortions, still-births, birth defects, and growth retardation of infants fed contaminated breast milk may result. Accidents, bites, heat stroke and allergies are common. In some cases the hazards to women are different from those to men. For example, in rice cultivation, long hours spent standing in water while weeding and transplanting increases women's susceptibility to backaches, postural defects, arthritis and rheumatism, infectious and parasitic diseases, insect bites, and so on. Various post-harvest tasks which are generally allocated to women, such as pounding, dehusking and winnowing grain, generate dust which causes respiratory infections.

4.17 Cooking, which occupies a substantial portion of women's time (at least three hours per day in most rural Indian homes) -- and is almost exclusively women's preserve -- has its specific hazards. Over 90% of

households in India use wood, dung and crop residues as cooking fuel. These emit harmful pollutants which remain in the cooking area because of inadequate exhaust arrangements. Smoke-filled huts are a common sight throughout rural India and in low-income urban areas. A study of four villages in Gujarat found that women 'cooks' were exposed, on average, to 100 times (range: 7 to 400 times) the level of suspended smoke particles deemed acceptable by the WHO (Smith, Agarwal and Dave, 1981). They were exposed to amounts six times higher than other household members and 15 times higher than a resident of Delhi (one of the most polluted capital cities in the world). These levels would be higher still in winter and during the monsoon.

4.18 Wood smoke causes lung problems which in turn place a strain on the heart resulting in a disease known as cor pulmonale. A 15-year survey in a Delhi hospital showed a similar incidence of this problem among men and women. While the etiology of the disease in men was thought to be tobacco smoking (75% of men smoked, but only 10% of women), among women it was attributed to kitchen smoke inhalation. The age of onset of the disease was lower among women, and nearly all the women affected were from low income groups.

4.19 There also is increasing evidence linking exposure to pollutants to impaired fetal development, reduced birth weight and greater risk of perinatal death. In addition, conditions such as anemia, which reduce tissue oxygen, also make women more susceptible to the effects of pollutants. (As noted earlier, respiratory diseases are a leading cause of death among women and girls over 5 years of age.) Besides the eye, nose and throat problems and respiratory diseases brought about by these fuel emissions, burns and injuries are common. Women begin cooking as young girls and continue to do so for most of their lives, increasing their risk of suffering from cancers associated with certain smoke pollutants. The development and promotion of smokeless chulhas, stoves which are less polluting and potentially more energy-efficient, are an appropriate response to this problem. Unfortunately, the popularity of some of the new stove models among women is jeopardized by the time it takes to prepare the fuel and to manipulate the stoves' dampers for effective functioning.

4.20 Carrying water is one of the most demanding tasks undertaken by rural women (and children). The ILO recommends a maximum load of 25-30 kg for women, but this is often exceeded. Heavy loads of as much as 40-50 kg carried on the head, shoulders or hips require muscular strength and skill. Growth deformities (scoliosis) may occur among children who carry heavy loads from a young age. Over a period of time postural defects of the neck, spine, and pelvis may develop. Headaches, fractures, slipped discs, rheumatism, arthrosis, ankylosis, and paralysis due to accidents, are some of the problems commonly encountered. Over the long distances or difficult terrain often involved, a great deal of energy is consumed. Often the distances increase during the dry season, when food - and therefore energy - reserves are at their lowest (and agricultural work also heaviest). A pregnant woman is not exempt from this arduous task and problems of fetal growth often result. After delivery, the difficulties of wound healing are exacerbated by work of this nature. Collection of water also increases exposure to water-related diseases such as hookworm or filaria.

4.21 Some other occupations which are known to have adverse health effects, and the associated problems, are given below:

- In the carpet industry, a squatting posture and immobility predispose women to ankyloses and chronic postural defects. Subsequent sterility or difficult pregnancies are some possible effects. Many women suffer from tuberculosis, anemia and eye problems.

- The eye sight of young women working 12-14 hours a day in the 'zari' (gold-thread) embroidery industry is reportedly damaged within a period of 5-8 years. Poor lighting conditions in micro-chip factories, which are among the major "modern" employers of young women, could result in the same problem.

- In the bidi industry, workers are exposed to tobacco dust and continuous long working hours, making them susceptible to diseases like tuberculosis, asthma, allergies, backaches, and rheumatic complaints.

- Women engaged in occupations such as cashew-nut processing, matting of coir and jute, cotton and tea plucking, rubber tapping and the textile industry are exposed to toxic chemicals and physical stress. Similarly, the lead paint industry increases exposure to toxins. Dermatitis is common among those exposed to chemicals.

- The slate, cement, asbestos, and even cotton industries generate dust which results in lung problems such as asbestosis, silicosis and byssinosis. The National Institute of Occupational Health (1986) has reported prevalence rates of up to 34.1% for silicosis in the mines of Bihar, 45% for pneumoconiosis in coal mines and 8.4% for byssinosis among textile workers. Rates of 6.5%, 30% and 9% were reported for asbestosis, silicosis and lead poisoning, respectively. These conditions are frequently unrecognised. They predispose a sufferer to tuberculosis and are often confused with that disease.

- In factories producing matches and fireworks (which employ three times as many girls as boys), accidents are common. In glass factories and brick kilns, working conditions include exposure to unbearable heat.

- The Self-Employed Women's Association in Ahmedabad, Gujarat, surveyed women workers in the garment industry and found a high percentage of workers had complaints of chronic pain, eye problems, etc. (Chatterjee, 1987). An accompanying 'ergonomic' study ascribed these problems to poor physical and lighting conditions in the work environment (mostly women's homes) (Ghosal and Chakraborti, 1987). Among SEWA's chikaan (cotton) embroidery workers in Lucknow, U.P., problems of eye strain and vision were

common and remained untreated.

- Women are employed as head-loaders, hand-cart pullers, in the construction industry, and other occupations where they have to carry heavy loads (in addition to their domestic work which involves carrying loads of fuel-wood and water). Disorders of the circulatory system, pelvic organs, muscles, spine and limbs and uterine prolapse are common. Deformities result if such work begins prior to completion of growth. There is no specific legislation on the maximum loads women should carry, and pregnant women engaged in such work in the informal sector often continue to work until delivery.

4.22 Many occupations lead to health problems that are further aggravated by malnutrition, anemia, frequent child-bearing and the fatigue caused by long working hours. Indeed, many common problems may be exacerbated by poor working conditions, low wages and malnutrition. These linkages result in occupational diseases often being ascribed to poverty, so that no efforts are made to remove the direct causes.

4.23 In instances where mechanisation is threatening women's employment, as for example, in the tobacco industry, an "either-or" situation seems to exist: the women employees must either suffer the hardships and hazards associated with the work or accept the consequences of mechanisation, such as mass displacement from work.

4.24 Doctors are inadequately trained in detection and treatment of occupational diseases, and so do not "notify" them, as required, which results in the poor data base available on occupational diseases. Delays in diagnosis often further aggravate the problem. It is not uncommon for serious conditions to be described as "psychosomatic," particularly when the affected person is a woman.

4.25 There is no comprehensive legislation for the protection of women against occupational health hazards. Some protective measures exist under the Factories' Act, Workmen's Compensation Act, and Maternity Benefits Act, and some welfare schemes exist. But these have not been effective, particularly as they apply to the formal sector only (which comprises only 4.3% of the total work force in the country). Few occupations have organized health services for workers. An exception is the tobacco (bidi) industry which has both a governing law and dispensaries set up, although these are underutilized, and outreach programmes to help women workers within homes are lacking. Even within the organized sector, women may not have access to the necessary health care.

Maternity Benefits

4.26 Although the Maternity Benefits Act guarantees women workers in the organized sector full protection of employment during pregnancy, coverage of delivery expenses, and maternity leave, few women actually benefit from the Act or its related scheme. According to the Department of Labour (1984), about 9% of women workers in the plantation and the mines sectors and 0.45% of

those in factories filed claims for maternity benefits in 1981. (The total number of women workers in these three sectors combined was less than 600,000 -- i.e., fewer than 2% of all women workers.)

4.27 Hirway (1985) studied the working of the Maternity Benefits scheme in the state of Gujarat and concluded that less than 2.5% of women workers in the state were covered by the Act, about one-fifth of these (or 0.5%) actually received the benefits, and only a portion of these in turn received all the benefits laid down by law. In general, employers considered women workers less reliable, less efficient, and more expensive, and so tried to avoid giving women long-term employment and hence denied them maternity benefits. At the same time, women's weak bargaining power in the labor market discouraged them from fighting for their rights. Implementation of the Act by the government was also quite inefficient. Hirway concludes that the Maternity Benefits Act does not really help to protect women's employment or look after the health of working mothers or their infants, therefore failing in its prime responsibility to enable women to work and carry out family responsibilities.

E. Women's Work and Household Nutrition

4.28 There is considerable evidence from around the world that women's employment has the potential to benefit household nutrition through increasing household income. Gulati (1978) found that daily nutritional adequacy in agricultural labor households in Kerala was related more to women's than to men's employment. She estimated that on days when both the male head of household and his wife were employed, their shortfall in terms of calories were 11% and 20%, respectively, while on days on which the woman was unemployed the shortfalls increased to 26% and 50%, respectively.

4.29 A comprehensive study on the effects of maternal employment on child nutrition in low-income households was conducted by Shubh Kumar (1978) in Kerala. She found that when women were in the labor force, there was a significant positive wage income effect on child nutrition. This effect of wage income was absent when mothers were not in the labor force. Seasonal differences in income/food availability and variations in fathers' employment together suggested that the effect of income on child nutrition was a result of the combined effects of family-farm income and wage income. In households with some land, women contributed more to the family food by cultivation than by working for wages. In landless households, lack of food in the household may have been the reason for the mother going out to work. Mother's income was particularly important in landless households in the slack season.

4.30 Among poor households, both seasonality of employment and the resultant fluctuations in intra-household food availability have detrimental effects on nutritional status, particularly of women and children. For example, Palmer (1981) reported that pregnant/lactating women often lose weight during peak work (low food) seasons, and infants may be summarily weaned at such times. As women's agricultural work tends to be seasonal because of its task-specificity, households dependent on women's work for their nutritional adequacy would be especially vulnerable. Seasonal

variations in food availability often exaggerate differentials in food intake between men and women. When more food is available it appears to be preferentially allocated to males, thus increasing the gap.

4.31 It is important to note that households with low average food availability are especially at risk during lean periods, as the shortfalls in caloric intake would be exceedingly drastic. It is at these times when women and children may fall below the survival line. Moreover, even among slightly better-off households, discrimination against females in food resource allocation may render them more susceptible to inadequate intake. To some extent, the availability of off-season employment and food under food-for-work schemes may mitigate the detrimental effects of agricultural seasonality on nutritional status.

4.32 Of particular concern in this context are low wage rates for women which entail long working hours to earn a meagre living. In order for women's work to improve household nutrition and health status, the wages received must compensate the energy costs to the household of the work performed. If women engage in physically grueling work (eg. in mining or the construction industry) to earn only a few rupees a day, the energy costs of their labour may not be offset by the 'energy' from the small amounts of food they can purchase with the income received, either for the household as a whole or for themselves. In other words, if the income received by women for their work is inadequate to compensate for their energy output, it would not constitute an increase in household welfare but, rather, a net drain on household resources. Included in women's energy expenditure calculations would be the 'costs' of travelling to work, so that locational characteristics of employment are important is assessing the net value of women's work.

4.33 In India, the Minimum Wages Act and the Equal Remuneration Act are germane to this issue. A "minimum wage" should ensure compensation for energy expended in labour and the ability to purchase a higher level of well-being among the poor, while equal remuneration guarantees this as much for women as for men, also taking into account their higher energy needs to meet reproductive and domestic work requirements. Increased wage rates would presumably enable women to increase the amount of time available for child care while maintaining the level of income required for food purchases. Policy for women's development should promote those employment options for women which provide a net positive subsidy to women's energy and aggregate household energy. In rural areas, the paucity of employment choices available to poor women who are mostly engaged in subsistence agriculture or agricultural labour is of concern. It is difficult to say, at this juncture, what alternative types of women's work meet these criteria.

4.34 Alternatively, women may receive an adequate wage which is spent on providing 'energy' for other members of the household but not on refilling their own, resulting in a net transfer of human energy, a problem of intra-household allocation. There is no information available on the nutrient consumption of working vs. non-working women (all other things being equal). A key question is : when women participate in the labour force, does household food allocation change?

F. Women's Decision-Making Role

4.35 In order for women's income to bring about improvements in the nutrition of children (and of the women themselves), it is believed that women should have control over their wages. Some studies indicate that where women exercise such control, they spend their incomes on food and other basic needs (while men, apparently tend to spend portions of their income on liquor, cigarettes, etc., according to Mencher and Sardamoni, 1982). Thus, enhancement of women's "decision-making roles" would need to be an intermediate step between their earning and its positive effects on household health. In addition, of course, the decisions which women make would need to be those which increase 'health-producing' goods or services for the household, and allocate these in favour of women and children.

4.36 In their study of a village in Andhra Pradesh, Bidinger et al. (1986) found that employment ("household" and "female") was a major factor affecting the equitable allocation of food resources and the total energy intakes of children under 6. Whether on- or off-farm, female employment was a more important determinant of the dietary intakes of children than income or landholding size. This implied that working women had more say in how income was spent and in food distribution within the family. The researchers believed this was so, "as male members (saw) them as more competent." (Food was less equitably distributed in nuclear than in joint households, perhaps because of wives' deference to their husbands status.)

4.37 Research in Nepal established that women used their incomes mainly for household daily consumption or "children's support" (though food was not specifically mentioned) (Acharya and Bennett, 1981). In the Philippines, household food expenditure and dietary intake were found to increase when the mother participated in the labour force (Popkin, 1980; 1983). A study of women participants in the Maharashtra Employment Guarantee Scheme, a food-for-work program, found that the nutritional status of children was better when women received the cash or grain payments given (ILO, 1979).

4.38 While the study in Nepal found that women's decision-making role was strongly influenced by market participation, women's employment may not guarantee enhancement of their decision-making role. In fact, one study notes that decisions regarding choice of employment - between agricultural and non-agricultural work, between working near the village or at a distant location, between less remunerative and more remunerative jobs, etc. - are themselves taken by the male head of household for all members - men and women - in the family (Dasgupta and Maiti, 1986). This study reported that women's wages were generally spent on household welfare, while men gave some income to the household. In general, men tend to control decisions on the use of all household income, including women's wages. Harriss' (1986) study of three villages in Tamil Nadu found that men controlled market decisions relating to food in 60% of cases and decided jointly with their wives in another 15%, leaving only 25% of households in which women were primarily responsible. In the majority of households women had some say in the qualitative decisions (e.g., the "choice of ingredients"), but had little say regarding quantities, regardless of whether they participated in wage work or not. No clear

differences emerged between "propertied" and landless households in any of the three villages. In two of them, there was some indication, however, that women's role was greater in the better-off families and lesser in the assetless families.

4.39 In sub-Saharan Africa, a somewhat different situation prevails. There, women are largely responsible for family maintenance, which encourages them to work specifically in activities which generate the cash or kind necessary to fulfill their role as providers. Jones (1982) established that larger proportions of Nigerian women's incomes were spent on food, clothing, medicine, utensils and other household items, than of mens incomes. In the Ivory Coast, women provided almost 54% of food in the household and 58% of non-purchased foods (Berio, 1983). Women's contribution to self-provisioning food production has also been documented in Nepal (Mercier and Kumar, n.d.). These findings have relevance to India because of women's substantial role in subsistence production. They suggest that women who work in own-farm production may be able to allocate larger proportions of their produce to household nutrition than those who are engaged in wage work.

4.40 Evidence for the importance to household nutrition of women's income from non-farm employment is scanty. In Ghana, Tripp (1982) found that income from trading affected child nutrition more positively than that from farming, and that women's income from petty trading had the greatest impact. Trade income was not subject to the fluctuations affecting farm income. Women traders controlled their own income, spending most of it on food.

4.41 In summary, a few important points can be reiterated. First, a large proportion of poor households are exposed to malnutrition because their lack of resources results in an effective demand for food which fails to meet nutritional requirements. Second, both economic and cultural factors result in differential food allocation between men and women, and between boys and girls. Under conditions of extreme food scarcity, families attach least priority to their small children, particularly their daughters; in other situations as well, males may be preferentially allocated available food. Third, there is evidence that women's wages have a positive effect on nutrition within households, so that efforts to improve women's participation in wage work would serve to improve consumption levels (of "basic needs") among the poor, perhaps to a greater extent than if the same wages were paid to men. However, the possibility that women's time away from home may adversely affect child health (see below) brings home the need for strategies to increase women's employment to be linked to the provision of support facilities required for child care, and to efforts to improve women's access to health care.

G. Women's Time Allocation to Productive/Domestic Work.

4.42 There is a paucity of information in India on the effects of women's work on child welfare (child care, health and nutrition), particularly with regard to different types of work, levels of income, distance of work from home, working hours, ability to care for children when working, or alternative child care facilities within the family or outside. Rigorous

"time-allocation" studies which would allow assessment of the trade-offs between women's productive and domestic roles are also missing. However, evidence for various relationships can be gleaned from studies in other developing countries and their significance extrapolated to the Indian situation.

4.43 In support of the Indian studies discussed earlier, a survey from the Ivory Coast highlights women's substantial contribution to total household time spent in both productive and domestic activity (Berio, 1983). Women contributed 39% of the time spent in "conventional" economic activities, 71% of that spent in subsistence economic activities, and 87% of domestic activity time, including about 95% of the time spent collecting water and gathering fuel. They spent 70% more hours in productive work than men. Even in Nepal, it was found that women spent as much time in crop production as men, and in addition attended to domestic animals and household chores (Mercier and Kumar, n.d.)

4.44 A recent study of five villages in different agro-climatic regions of India found that the three most time-consuming activities engaged in by women were cooking, cultivation and fuel collection (Dasgupta and Maiti, 1986). The daily labour time of women varied from 10.4 to 14.2 hours in different seasons in these villages, with cooking being the most variable - between 1.7 and 5.4 hours. Cooking time varied inversely with time spent in agricultural work. Fuel collection accounted for 9.4% of total household labour time (including children's labour), depending considerably on the distance of the village from forest land. While women contributed about 70% of total household labour time, on average, they contributed only about 31% of household income (both cash and kind).

4.45 The fact that women work more hours than men is corroborated by Sen (1988), and she also found a heavy concentration (58% on average) of women's working hours in household work. An additional 37% of women's time was spent on agricultural work. This applied to families in all socio-economic classes in the village she studied in Madhya Pradesh. Only among the better-off did women allocate much less time to wage work. Examining the total working hours put in by family members in different categories of work, Sen found that women contributed 40% of non-wage economic work (i.e., "own" agricultural tasks), and 35% of wage work in agriculture. Only in non-agricultural wage work did women's contribution fall well below men's. Class differentials were strong in the work time allocation of men and women. Down the class hierarchy, men and women participated in work of greater arduousness, with a greater tendency to move further away from home.

4.46 Where women's labour force participation has been correlated with child malnutrition, the explanation usually given is that mother's time away from home results in less time being spent in child care. However, studies often fail to establish whether child nutritional status is the "cause" of mothers' employment, or the "effect." Mothers' participation in the labour force may, indeed, be an indicator of household nutritional risk. As mentioned above, the lower care factor may be partially offset by the increased income, or be negligible, if other child-minders are available. Studies which simultaneously control for income level, and assess 'time lost' vs. 'income

gained' are unavailable. In addition, differentiating characteristics such as the type and location of work which could provide pointers to courses of action, are seldom considered. For example, flexibly scheduled work, close to home would allow women to feed infants and young children with the necessary frequency, suggesting that home-based production is "compatible" with child care, while formal sector jobs are less so.

4.47 Among their observations in rural Andhra Pradesh, Bidinger et al. recorded that women from medium- and big-farm families who hired and supervised farm labor had little time for child care. This, they felt, accounted for some of the severe malnutrition found among children in these better-off households. In contrast, they explain child malnutrition in the poor households as being due to a lack of food.

4.48 There is conflicting evidence on the effects of women's work on duration of breastfeeding, bottle-feeding or child weaning in developing countries. Studies in the Gambia, Nigeria, and Bangladesh suggest that during peak work seasons women's time constraints interfere with breastfeeding (Chambers et al., 1979; Chowdhury et al., 1978). In Bangladesh, women in landless households were more affected than those in small farm households during the rice-cropping season, but the reverse may have been true post-harvest, so that on average the poorer women spent more time breastfeeding their infants. Reduction of suckling and weaning of children during the rainy season led to children losing weight.

4.49 In an effort to estimate the relative 'cost-benefit' of women's work and breastfeeding of infants, Reutlinger and Selowsky (1976) calculated that working mothers among unskilled domestic workers in Calcutta would have to use half their wages to replace the quantity of breast milk lost (to the infants while the mothers worked) with an equivalent amount of cow's milk, at prevailing wage rates and prices. Because the required marginal propensity to spend on milk was much higher than that observed, the authors concluded that mothers' labour force participation could have important negative effects on child nutrition. However, their conclusion was based on economic calculations and pertained specifically to a group of urban working women.

4.50 Elsewhere, working women have been found to breastfeed longer, or to introduce supplementary foods earlier, with positive effects on child nutrition (Van Esterik and Greiner, 1981; Ferry and Smith, 1983). In fact, the results of a study in Bangladesh suggest that women tend to reduce the amount of time spent in economic activity when they have an infant (Cain, 1979), rather than compromise child care.

4.51 A study in Malaysia assessed the compatibility of child care with different types of work (DaVanzo and Lee, 1983). It was found that women in informal sector work were accompanied by their children twice as often as those in agricultural work; that children between 2 and 5 years were more likely to be with their mothers than either infants or older children. In general, women with small children worked fewer hours in wage work, but women in agriculture with children between 6 and 10 years worked longer hours. Distance from home negatively affected the likelihood of mothers taking small children with them on non-market chores. This study found that an additional

infant increased the total number of hours spent on child care by 31 hours per week; children aged 2-5 years required an additional 12-1/2 hours per week, and children aged 6-10 years about half that amount.

4.52 Even if the working mother spends less time in child care, overall child care time may not be reduced because other household members take over for the mother. Popkin (1980) found that mothers spent 3 hours per week less on child care if they were in the labour force, but that overall child care was only slightly reduced due to substitution by older siblings (particularly adolescent girls). DaVanzo and Lee (1983) found that Malaysian women reduced child care time by ten minutes for every hour of market work, and meal preparation time by five minutes. Other household members filled these gaps. The presence of another female between 15 and 59 years of age in a household was associated with increased market work time of mothers (Mueller, 1979).

4.53 In rural areas, during peak work seasons, young children are entrusted to older siblings or other child-minders more often than usual, which may partially explain the negative consequences for their nutritional status mentioned above. However, while the quality of care and consequences to child nutrition of 'alternative child minding' have not been unequivocally assessed, available studies imply, on the whole, that children of working mothers do not necessarily receive less attention. They substantiate the importance of the extended family and of "child labour" to the well-being of poor households, signalling that factors other than women's employment per se are crucial.

4.54 Working women often compensate for time away from home by working longer hours in employment and domestic work together. They may forego sleep or leisure time rather than reducing child care time (Popkin, 1983; Nieves, 1981). This behaviour fits the rational assumption that women work to provide higher levels of well-being for their children and households. The opposite presumption of inelastic time or and "either-or" approach to women's time allocation would seem to be fallacious, particularly in the context of the intense socialisation of women in traditional societies to be, first and foremost, mothers and child-caretakers. Ultimately, the cost of the increased time and energy spent is likely to be to the women's own health.

4.55 In effect, the poorer the household, the more hours women work on production (market and home-based) and domestic chores out of necessity. Although the traditional division of labour for productive activities disappears under these circumstances, women nevertheless assume the responsibility for domestic work. Landlessness, male unemployment and out-migration, seasonal work availability, and 'heading households' (i.e., being the main or sole economic providers) put even greater burdens on women.

4.56 However, working women may attempt to rationalise time by resorting to "drudgery-reducing" technologies, if these are available. For example, food processing time may be reduced through use of grain mills; or cooking time by purchasing processed foods. The health effects of these must also be subject to scrutiny. The implication of infant weaning foods, snack foods, etc. in child malnutrition is well known, as are nutrient losses due to food processing. In addition, the high cost of these foods may result in a

reduction of calorie availability to the household.

4.57 Technologies which reduce time spent in water and fuel collection would appear to be less controversial at least from the point of view of household health. A study of time use in some Mexican villages showed that women spent more than an hour and a half per day carrying water (Pedrero, 1976, cited in Clark, 1981). Water collection in some parts of Africa can consume up to 12-15% of a women's available energy in a day. Provision of accessible sources of potable water supply could leave women more time and energy for economic or domestic activities, and reduce the burden on their own health.

H. Other Benefits to Health of Women's Work

4.58 Women's participation in the labour force also brings about changes in awareness and attitudes which may have longer term implications for family/child health. In addition, increased contact with the outside world enhances access services including health and education programmmes which are likely to improve health. Mother's nutritional knowledge, which is an important factor influencing child nutrition is likely to increase, as well as knowledge about health care, family planning, etc.

4.59 While the foregoing discussion examines income/food and time as inputs into child health, the important component of health care has not been discussed. Unfortunately, the many studies on women's work and child nutritional/health status which have been reviewed have ignored women's access to health services as a factor that may mediate the relationship between women's employment and child health and nutritional status. Although it is possible that health care as a factor is subsumed under "child care activities," it is likely to be a far more important determinant of child health than is currently acknowledged in the literature on women's employment.

Chapter V: Marriage and Fertility

5.1 Closely related to women's health and productivity are the issues of marriage and fertility. While marriage practices have their basis in cultural patterns, they are affected by (and affect) other socio-economic factors -- such as education and employment. These inter-relationships and the close link between marriage and childbearing, all of which have implications for women's health, clearly also affect women's productivity.

A. Mean Age at Marriage

5.2 The age at marriage of a population influences levels and patterns of fertility because it determines the length of the 'effective' reproductive span. India's high population growth rate is in part ascribed to the prevailing low mean age at marriage (MAM), one of the lowest in the world. Although marriage in India is traditionally a two-stage process -- betrothal followed after a variable interval by cohabitation -- the onset of menarche customarily determined the age at cohabitation, the average age at menarche being about 12.3 years. Early marriage is both a cause and effect of women's low status, low levels of schooling and formal employment. It inevitably leads to early childbearing which is detrimental to the health of young girls who, as we have seen, are already at considerable risk of malnutrition and debility, and are not yet fully grown; and the concomitant prolonged childbearing places a great burden on older women's physical and (families') economic resources. Thus, a critical target group for action on fertility in the context of women's health is the youngest age group of "adolescent (teenage) girls."

5.3 Among marriages that took place during the 1971-81 decade, the mean age of the women was 18.3 years, and of the men, 23.3 years. The gender differential remains wide despite substantial recent improvements. During the 1971-81 decade, the MAM increased by 0.85 years for men and 1.2 years for women, and most states registered increases of over 1 year among women. Only if these trends continue will the mean ages rise above 20 for women and 25 for men by the year 2001, with a possible narrowing of the male-female differential. As one would expect, the MAMs are greater in urban than in rural areas, although, between 1971 and 1981, the mean ages increased more in rural areas, signalling a closing of the rural-urban differential in marriage ages for both males and females.

5.4 The all-India MAM for women is in fact very close to the prescribed legal minimum age for marriage of 18 years -- but in several states the MAMs are below this minimum (see Table 12). As is the case with other indicators of women's status, the states in the South and West have higher MAMs than those in the Hindi-speaking belt in the North. Kerala has the highest MAM for females (21.8 years) and Rajasthan the lowest (16.1 years). These means suggest that in Rajasthan, Madhya Pradesh, Bihar, Andhra Pradesh, Uttar Pradesh and Haryana, a sizeable proportion of female marriages takes place below the legal age, and that even in Maharashtra, Orissa, Karnataka, West Bengal and Gujarat, where the means are within 1.5 years of the legal minimum, a large number of marriages are transacted early. In the states with high MAMs (e.g., Kerala) -- and lower proportions of women married at any

given age or altogether -- high rates of female education and labor force participation play major roles.

5.5 These low ages at marriage are reflected in the proportions of girls married among younger age groups (see Table 13). In 1981, for example, 7.8% of 10-14 year old girls in rural areas and 2.2% in urban areas were married. The share of married women among 15-19 year olds is considerably higher: almost half of rural girls and over one-quarter of urban girls, or 44% for the country as a whole. In contrast, only 2.6% of males under 14 are married, and only 12% of those between 15 and 19 years. Once again, there is considerable variation among the states concerning the proportion of married women aged 15-19 years (see Table 14). In Rajasthan, Bihar, Madhya Pradesh and Uttar Pradesh, it exceeds 60%, while in Kerala, the Punjab and Tamil Nadu it is less than one-quarter. Table 14 also shows that in most states almost "universal marriage" obtains for women by the age of 24.

5.6 Raising the legal minimum age of marriage is an important policy prescription to decrease fertility, generally to enhance the status of women, and to improve women's and child health. However, legislation has remained ineffective in the face of prevailing social customs and mores, the low status of women, poor economic conditions and limited education and employment opportunities for girls. More effective interventions are required to create social consciousness in favor of delaying marriage beyond current norms. Female education is one such intervention: it results both in marriage being postponed and in changed perceptions about the appropriate age of marriage. As Table 15 shows, the MAM for girls increases considerably with education. Only for girls who have attained the matriculate level, however, does the MAM exceed the currently prescribed minimum marriage age of 18 in both rural and urban areas. In addition to schooling, employment opportunities - that bring in meaningful incomes, are important for girls to successfully delay marriage

5.7 A recent study on "growing up in rural India" (Ranjana Kumari et al., 1988) demonstrated the manner in which female puberty, education, marriage and employment prospects are intertwined. In-depth interviews with 400 adolescent girls and their parents in several north Indian villages, revealed the social restrictions placed on young girls after puberty, and the consequent drop-out from school. Parents considered education beyond the primary stage quite superfluous for their daughters. Irrespective of educational status, caste or income, the girls were engaged in domestic tasks, and many in income-earning occupations. Over one-fifth of the girls (aged 10-16 years) were already married, and another one-quarter were about to be married. The majority of girls knew little about the physical changes of puberty, sex, pregnancy, child-rearing or child health care.

5.8 An analysis of factors influencing female age at marriage found that the literacy level of the population as a whole, and especially that of females, was particularly important (Srivastav, 1986). Interestingly, however, educated fathers appeared to exert a greater positive influence than educated mothers on delaying daughters' marriages. Other factors that were positively correlated with female age at marriage at the state level were: level of urbanisation, per capita income, non-agricultural employment, and mass media.

5.9 Conversely, female labor force participation in agriculture had a significant negative correlation with female age at marriage. Higher rates of female participation in agriculture are indicative of more "traditional" societies. Plausibly, where there is high demand for agricultural labor coupled with a low ability to hire wage labor, daughters-in-law may be obtained early as a way to get labor. While unmarried daughters tend to be kept in seclusion, married women can work outside the home if necessary. Where girls are inevitably - and prematurely - absorbed into traditional, low-paying agricultural work, female "work participation" or tradition itself may act on age at marriage by reducing the value attached to girls' schooling. However, in this analysis, the influence of these latter factors was found to be considerably weaker than that of literacy levels.

B. Fertility Rates

5.10 The corollary of early marriage is early childbearing. The social pressure on young married girls to prove their fertility is reflected in their age-specific marital fertility rates (ASMFR) shown in Table 16 for 1978. Among 15-19 year olds, the ASMFR was 175.2 in rural areas and 197.3 in urban areas -- i.e., a birth occurred in 1978 to 17.5% of married 15-19 year olds in rural areas and to 19.7% in urban areas. For this age group as a whole (without distinction as to marital status), the age-specific fertility rate (ASFR) was 92.9 in 1984 -- meaning that one of every eleven girls aged 15-19 years bore a child that year.

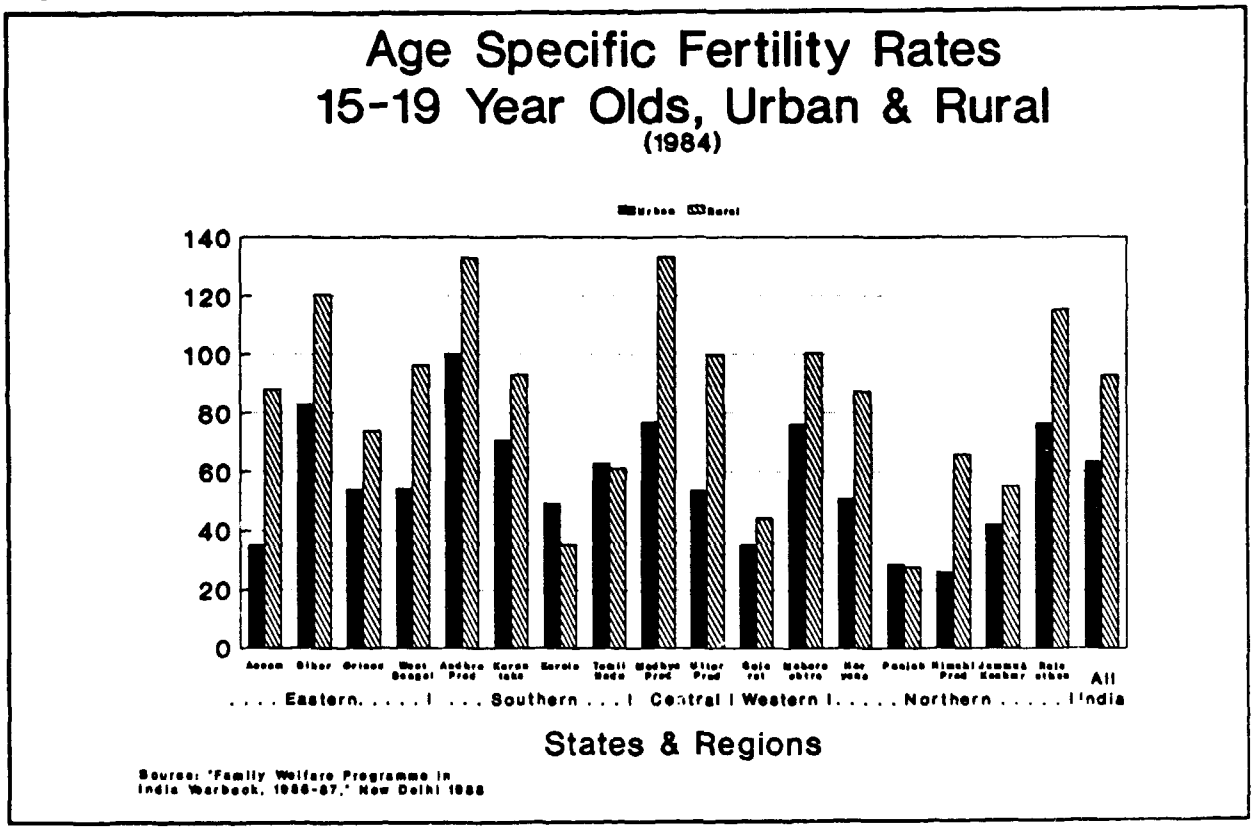
5.11 The percentage of 20-24 year old married women bearing children is higher still, but the ASMFR then declines in subsequent age-groups. It is notable that the urban ASMFRs are higher than the rural rates for 15-24 year olds, but they fall sharply -- and below the rural levels -- thereafter, suggesting that urbanization hastens childbearing but curtails the period over which it takes place, thereby also reducing the number of births per woman. This undoubtedly reflects the availability and nature of female employment opportunities in urban areas (perhaps more than the availability of education) as well as better access to health and, particularly, to family planning information and services. Urban areas generally support the possibility of having fewer, "higher quality," surviving children due to higher incomes, greater availability of family planning, health and education services, but they also necessitate smaller families because of lower availability of 'child care networks,' such as the traditional joint household.

5.12 Looked at differently, the 15-19 year age-group also accounts for a fair percentage of all births occurring: 8% in rural areas and almost 7% in urban areas (see Table 17). More than one-third of all births take place to women under 24 years, and two-thirds to those under 29. Only 5% of all births occur among women over 40 years who are at high risk of maternal and infant death because of their relatively advanced age.

5.13 State-level age-specific fertility rates for the 15 to 19 year age-group are given in Appendix Table 7. Although the general positions of states are similar to those they occupy for other indicators, such as mean age

at marriage, the rates are vastly different across the states, ranging from 28 in Punjab to 125 in Andhra Pradesh -- i.e., while less than 3% of 15-19 year olds in the Punjab had a child in 1984, over 12% of those in Andhra Pradesh did (See figure 6).

Figure 6



5.14 A clearer picture of the influence of age at marriage on subsequent fertility at different age levels can be obtained from the data in Tables 18 and 19. Fertility among women married before age 20 is highest at age 20-24; those married between age 21 and 23 are most fertile between 25 and 29, as are those married after age 24. Although the highest age-specific fertility rates recorded appear to be the same regardless of age at marriage (see Table 18), the proportion of higher order births is clearly greater among women married before age 18 (see Table 19). Hence, the lower total marital fertility rates among women married at higher ages (Appendix Table 8).

5.15 Appendix Table 8 shows various indicators of fertility by different socio-economic characteristics for the female population as a whole. They show that rural/urban residence, religion, caste, educational level, occupation, per capita expenditure and age at marriage all influence fertility. The effects of education, age at marriage and per capita expenditure on total marital fertility rates are particularly profound. Cochrane (1979) reviewed studies from several developing countries and found a strong inverse relationship between women's education and fertility. The

relationship between fathers' education and fertility was weak, and even weaker when controlled for income. On the other hand, when controlled for income, the relationship between mothers' education and number of survivin children became stronger, implying that the effect of women's education on fertility is independent of, and perhaps stronger than, that of income.

5.16 Education influences fertility directly through changing attitudes to childbearing and family size, as well as indirectly by affecting the age at marriage. As suggested earlier, education can influence the age of marriage in a number of ways: by increasing the number of years in school; by delaying the time when a girl receives instruction in household duties, such as cooking; by changing attitudes to marriage; and/or by increasing the likelihood of gainful employment which will, in turn, delay marriage. However, as a result of a detailed community-level study, Hatti and Ohlsson (1985) contend that the relationship between years of schooling and marriage delay is weak and that, instead, other "modernizing factors," such as changes in economic conditions, increasing demands for dowry, longer search periods for grooms, etc., are more important explanations for delayed marriage.

5.17 The influence of education on age-specific fertility and marital fertility can be seen in Table 20. Illiterate women have considerably higher fertility than literates. With increasing levels of literacy, fertility declines. As this is less true of marital fertility, it appears that literacy may indeed act on fertility through changing marriage rates. Literacy also results in fewer higher order births with considerable differences between women having below primary level education and those with five or more years of schooling (see Table 21). This is further borne out by the lower total marital fertility rates among more literate women (Appendix Table 8).

5.18 It has been suggested, in fact, that maximal effects on fertility will be achieved by reducing the drop-out rate of girls from primary schools, thus increasing the proportion of women who complete at least primary education (Jain, 1982). Investment in primary education may well be the most effective way to reduce fertility in the long term. As noted above, education affects fertility by increasing the age at marriage and reducing the number of children born to a woman. As India's female literacy rate has increased, the average age at marriage has risen, and the child-woman ratio has declined. In 1981, there were about 695 children aged 5-9 years for every 1,000 women of reproductive age, and 546 children aged 0-4 years. In 1971, these figures had been 755 and 655, respectively. Thus, during a single decade, there was a decline of over 10% in the child-woman ratio, coinciding with a 6% increase in female literacy and a one year delay in the mean age at marriage of females.

5.19 The crude birth rate in India is currently (1986) 32.4 births per 1,000 population, with an average rate of 34.1 in rural areas and 27.0 in urban areas. Some early rounds of the National Sample Survey provided birth rate differentials by occupational groups (see Table 22). Interestingly, agricultural households tended to have an 'average' birth rate (i.e., comparable to that for "All Occupations"), while higher rates were found among "Service," "Crafts and Production" and "Transport" occupational groups. The "Professional-Technical," "Administrative" and "Clerical" categories (i.e., "white collar workers") had lower than average birth rates. (The lower rates

among "Mining" households could be the result of unduly heavy work combined with the extreme poverty of this group of workers.)

C. Mortality-Fertility Relationships

5.20 Early marriage and early childbearing also have other disturbing repercussions: higher risks of death to both young mothers and their offspring. The complications of early motherhood are inadequate growth, undernutrition, hypertension, anemia and the hazards of childbirth. Girls who are married and bear a child before the close of the adolescent growth spurt may remain physically underdeveloped, and hence are at greater risk of obstetric complications and maternal death, and of bearing low birth weight infants. The young girl who is underweight and has inadequate access to food is further stressed nutritionally by pregnancy. Taboos on eating during pregnancy further restrict her calorie intake which may be inadequate to meet her own needs, much less the extra required for a healthy baby. The high prevalence of anemia further complicates pregnancy and childbirth and reduces birth weights. Birth weight is correlated with the pre-pregnancy weight of the mother, with weight gain during pregnancy, and with hemoglobin levels. Low birth weight results in low infant survival. A girl's growth may be so severely interrupted by childbearing that she remains stunted for life. Ultimately, small mothers have small babies who grow into small mothers.

5.21 These complications are illustrated in Table 23 which shows the distribution of pregnancy-related deaths among women by different causes and age groups. In 1986, deaths related to pregnancy and childbirth accounted for about 12.5% of deaths among rural females aged between 15 and 45 years, and for 16% of those among the 15-24 year olds who are most at risk of maternal mortality. As mentioned earlier, the most common causes of maternal death are associated with malnutrition, particularly anemia. Other major causes, such as toxemia and septicemia, reflect the inadequate health care available to women in the ante-natal, intranatal and post-natal periods. Table 23 shows that the share of deaths due to toxemia and puerperal sepsis are highest in the 15-24 year age group, and that considerable numbers of deaths due to abortion, anemia and bleeding also occur among these young women.

5.22 The highest risks of death to both mother and child are associated with first births and those with a birth order above four. Thus, women are particularly vulnerable at the beginning and end of their childbearing period. As already noted, many first births occur before the mother has reached the age of 20, and girls who are married young are more likely to have high order births later on. The direct relationship between early marriage/childbearing and high infant mortality is indisputable. Infants born to women who married before age 18 have almost twice the risk of death than infants of mothers married after age 21 (see Table 24). Low birth weight is certainly one explanatory factor. Another is inadequate "maternal competence" -- shown by the strong inverse relationship between infant mortality and education (see Table 25). These data also demonstrate that the effects of delayed marriage and higher education on family health could well reinforce each other.

5.23 According to the 1979 Survey of Infant and Child Mortality (Office

of the Registrar General, 1981), the high rural infant mortality rate reflected the high proportion of births (20-25%) which had a birth order of five or more. Another correlate of high infant mortality is 'rapid' childbearing, or closely-spaced births. Das et al. (1975) found the mortality rate among children born between 1.5 and 2.5 years of a previous birth to be almost half that of children born within a 1.5 year birth interval. With longer intervals, the mortality rate decreased further.[1] These findings have been confirmed by a recent WHO survey of 6,000 Indian women which showed that the mortality rate of infants born within one year of a previous birth was twice as high as that of infants born after two years of a previous birth (IMRs of 200 and 100, respectively). A spacing of between 1 and 2 years resulted in an IMR of 145, while 3-4 years reduced the IMR even further to 80 (Ghosh, 1987).

5.24 It has been estimated that maintaining a two-year spacing between births could reduce the aggregate infant mortality rate in India by 10% and child mortality by 16%. It may also reduce maternal deaths because repeated, closely spaced pregnancies result in the nutritional depletion which renders a woman particularly susceptible to disease and death.

5.25 The issue of infant mortality brings us around to female children born of young mothers. Table 26 shows the sex ratio of children born and surviving by the age of their mothers. Although the figures indicate considerable under-reporting of females born to all mothers, the sex ratios are particularly low among births and surviving children of mothers under 15. This suggests that the female child of a very young mother is at particular risk of death -- because the young mother is under the greatest pressure to produce sons. In addition, Das Gupta's (1987) study in the Punjab showed that female infants of second or higher birth order were at particular risk of death, the sex differential in mortality being influenced more by birth order than by economic or education levels.

5.26 Along with increasing the total effective reproductive span of a woman, early childbearing also increases population growth by shortening the span between two generations. Young wives under social pressure to 'prove' their fertility are deterred from using contraception. If they lose a child, they are likely to compensate by having another pregnancy immediately -- and a large number of children in the long run. Thus, child loss shortens the interval between births, further aggravating the low nutritional status of the mother. Ultimately, the results are a larger number of births, closely spaced, a more depleted woman, and higher risks of maternal and child deaths. In sum, earlier marriage and childbearing lead to larger families and lower life expectancies for women. Postponement of marriage beyond the age of 20 and of the first birth could considerably improve this picture.

5.27 Because early and frequent childbearing pose high mortality risks

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[1] This analysis also suggested the possibility of another factor important to the survival of infants: the mother's previous child loss experience. Mortality was considerably higher among infants of mothers who had lost a previous child.

to mothers and infants, high fertility is of grave concern. However, the effects of child mortality experience on the fertility of women are well known and suggest that efforts at fertility control must be combined with mortality and morbidity reduction. From the standpoint of health service delivery, it is not unreasonable to assume that death and disease control strategies will encompass an ability to deliver birth control services as well. Experience in India has shown that the reverse does not necessarily hold. A major reason why families reject birth control is their desire to ensure one or two living sons. Bardhan (1987) has shown that son preference correlates inversely with female earnings across states. It would appear, therefore, that where women's economic status is low, their social status depends on mothering sons. While son preference is lower in states where a larger proportion of rural households are "asset poor," this may occur because of the weaker role of patrilineal inheritance among those who have little or no property to hand down.

5.28 That both fertility and mortality are influenced simultaneously by factors such as education is shown by an all-India survey of 5000 households (NCAER, 1987). The strongest differentials in the number of children ever born and in the percent surviving were by the education of the mother. A sharp fall in fertility occurred among women with six or more years of education, compared with those with five years or less. Survival of children increased from 80% among those with no education to 90% among those with 6+ years of schooling. Husband's education showed a very weak and unsteady pattern of association with fertility and mortality. Economic status also influenced both fertility and mortality, with sharp differentials occurring in survivorship, particularly between the highest (86%) and lowest income groups (66%). It is noteworthy that the survivorship of children born to women with six or more years of education is higher (90%) than those of families in the highest income group (86%). Furthermore, while a fertility-reduction effect is seen with women's education (perhaps partially effected by the higher age at marriage and age at first birth found among educated women), the two highest income deciles in fact have higher fertility than the lower deciles. (see below).

5.29 Appendix Table 9 ranks India's 14 major states by a number of indices, grouped broadly into 'Mortality,' 'Fertility,' 'Socio-Economic' and 'Health Service' categories. The groupings are roughly similar across the board: Kerala, Karnataka, Tamil Nadu, Maharashtra and the Punjab rank consistently well, while Rajasthan, Bihar, Uttar Pradesh and Madhya Pradesh rate uniformly poorly. The others (Andhra Pradesh, Haryana, Orissa, Gujarat and West Bengal) present a mixed picture, as we have encountered earlier. Appendix Table 10 gives the values of several of these indicators and the results of a correlation analysis of female literacy and the other variables (Office of the Registrar General, 1987). These are summarized below:

Correlation of Female Literacy with other Variables

	Including Kerala	Excluding Kerala
Strong Positive	Age at Marriage	Age at Marriage Urbanization Contraception
Moderate Positive	Non-Agric/HH Empl Sex Ratio Contraception Urbanization	Non-Agric/HH Empl
Weak Positive	Female LFP	Female LFP Sex Ratio
Moderate Negative	Percent SC/ST	Percent SC/ST
Strong Negative	Percent F Married Total Fert. Rate Birth Rate Infant Mortality	Percent F Married Total Fert. Rate Birth Rate Infant Mortality

5.30 Clearly, Indian women's reproductive roles exercise a disproportionate influence on their social status and also on their health. The inter-relationships between female education, employment, delayed marriage, reduced fertility, and reduced child and maternal mortality are intricate and strong. Childbearing is risk-laden in the presence of high levels of infection and malnutrition, and high fertility further exacerbates female morbidity and mortality. There is considerable evidence that delayed childbearing, wider spacing of births and bearing fewer children enhance child health and survival. Thus, the issues of women's health, women's control over reproduction, and child health are tied to women's social and economic status.

D. Social and Economic Phenomena Linking Nutrition, Health and Fertility

5.31 Besides interacting with maternal and child health and mortality in the 'biological' ways discussed above, fertility is also related to nutrition and health in ways defined by prevailing social and economic factors. At a general level, low socio-economic status simultaneously engenders ill-health, undernourishment and high fertility while increasing social-economic levels result in improved levels of nutrition and health, and diminished fertility. The effects of a major constituent of 'socio-economic status,' i.e., education have been discussed in some detail in Chapter II and in the earlier sections of this chapter; and those of women's employment have been linked with mortality (Chapter II), health (Chapter IV) and fertility (Chapter V). In this section a few other aspects are explored which are particularly important in the context of women's health and their productivity.

Economic Utility of Children

5.32 The economic utility of children is known to influence fertility and, as discussed above, also affects health and nutrition, particularly the nutritional status of females. The inter-relationships are complex, and only a brief overview of the issues is attempted here.

5.33 Children are perceived to have "economic value" in societies such as India's because they contribute labour to home-based production and domestic work, and because they provide parents with security in old-age. One study has even established that the number of children was positively associated with land acquisition by families over a ten-year period (as was women's participation in the labour force (NCAER, 1987). The participation of young girls in work has been documented, and contrasted with that of boys. An important issue is that while girls contribute work, boys are preferentially involved in wage work and hence are valued more, which is reflected in their higher consumption levels. The nutritional and health consequences for girls, and their implications for adult female health and "reproductive success" have been drawn above.

5.34 The 'net negative value' of young girls who do not bring in much cash income in early life and take away family wealth in the form of dowry in adolescence (or shortly thereafter) is the opposite of the perceived wealth from young boys wage work and support to parents in later life. Both are the bases of the "preference for sons," a significant factor underlying high fertility and the high mortality of female infants and children (including infanticide, and more recently feticide). Besides the resultant low social status of females, the physiological consequences for women of repeated pregnancies in the hope of bearing sons have been delineated. There are also consequences for the mother's health of having to nurse and care for more children. It is significant that respondents in the NCAER (1987) study perceived the advantages of fewer children as financial or beneficial to children's health, but less frequently in terms of the benefits to mothers' health. Only rarely was 'less work for the mother' seen as an advantage.

5.35 The economic value of children also has implications for schooling. Investment in boys' education is considered worthwhile because it is investment in their future contribution to family wealth. The higher participation of young females in household work is reflected in their lower school participation rates, and schooling per se is considered more a liability than an asset in the case of girls (who must be protected from males, and for whom a suitable groom must be found. A more educated groom requires a higher dowry.) The long-term consequences of low female education can be interpolated from the discussions on the ameliorating effects of literacy on high mortality and fertility.

Women's Seclusion: The Inside-Outside Dichotomy

5.36 The preferential investment in males and imposition of constraints on female consumption and activities are born of the prevailing system of patriarchy which is most obviously manifest in the practice of purdah. At one level, purdah "protects" women's virtue by restricting contact with males,

but, more detrimentally, it confines women to the household, with considerable implications for nutrition, health and fertility. Women perform all domestic tasks from an early age, with the nutritional consequences described above. By menarche, they are withdrawn from school to minimise contact with males, and are thus deprived of the education which can have profound effects on their own health and that of other household members. They are also thereby deprived of school meals, school health check-ups and other direct health inputs. Early marriage is another "protective" mechanism - but it increases the length of the reproductive period and, hence, fertility.

5.37 The patriarchal system prescribes that women's major role is bearing children, particularly sons. The consequences for health and nutrition of early, frequent and prolonged child bearing have been described above. Principles of seclusion proscribe women from seeking health services, particularly from male personnel. They cannot initiate discussion or action related to family planning, because sexual matters are in the male domain. They have limited access to information and resources, and their spatial mobility is constrained. Their work participation is circumscribed, which constrains earning and the advantages to health that higher incomes can bring. Their economic contribution is also played down, which consequently reduces their "entitlements." And so on.

5.38 Pervading all these interactions is women's subordinate role in decision-making, whether it be on food allocation within the household or on the use of contraception. In essence, a woman's status is determined by her reproductive performance, particularly the birth of sons. Thus, a young wife is under considerable pressure to bear a child, and reproduction does not cease unless the family is guaranteed one or two living sons. Only with age and after bearing a number of children does a woman acquire status as a mother-in-law. At this stage of the life cycle women exert considerable influence on younger women (daughters-in-law), and on household matters as varied as feeding, family-building, employment or expenditure.

Part B. Women's Access to Health Care

Chapter VI: Women's Use of Health Services

A. Introduction

6.1 The issue of women's access to health care is a complex one -- because it is both the outcome of women's status in society, including society's response to their health needs, and a determinant of women's health and productivity and, so, ultimately, of their status. One can view this relationship, however, as a simple feedback loop between women's social and economic status and access to health services. Improvements in one will fuel improvements in the other, with the ultimate desired effect of women's complete physical and mental well-being.

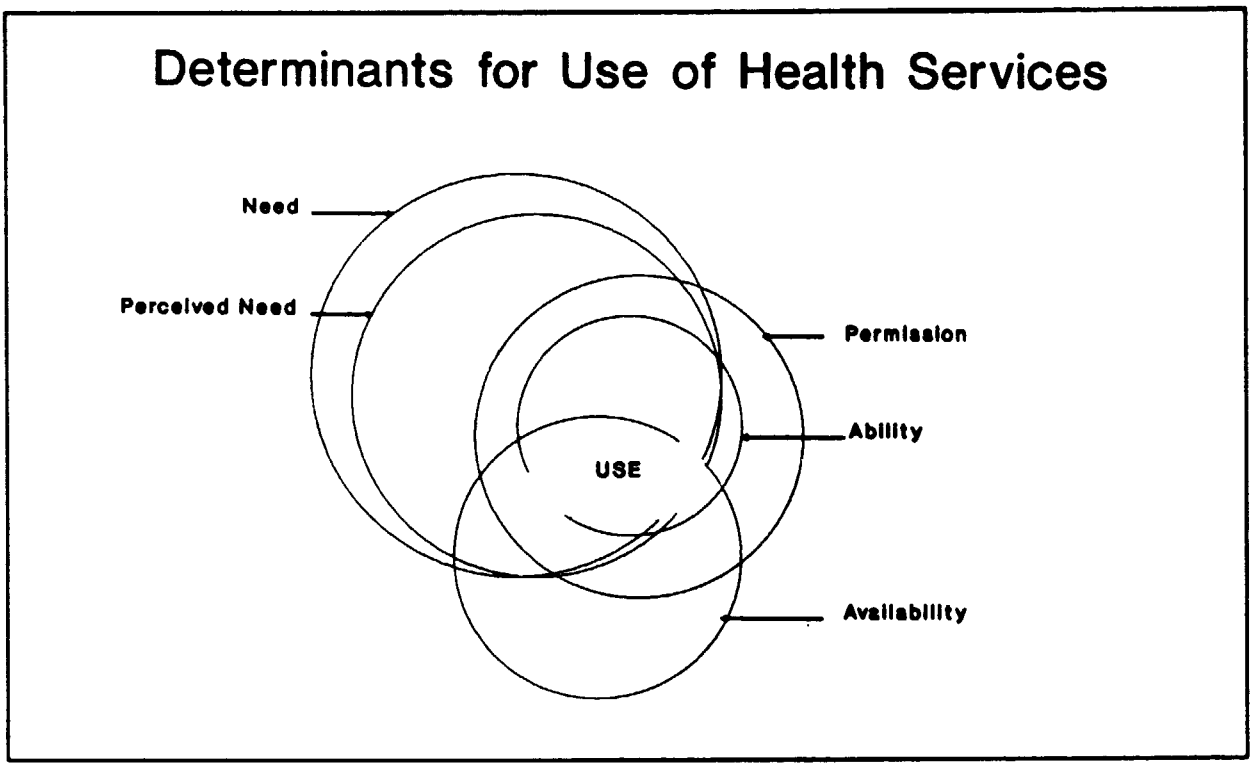
6.2 Four sets of factors influence women's access to health care, broadly termed need, permission, ability and availability (Chatterjee, 1983):

- o Need is the extent of ill-health among women, as shown by data on female morbidity and mortality.
- o Permission is the result of social factors which dictate whether women can seek health care outside the home, as well as define women's roles as health care providers within the household.
- o Ability is determined by economic factors which enable women to meet the costs of health care, offset the opportunity costs of seeking health services, or even judge whether there are any benefits to health care.
- o Availability refers to extant health services for women.

6.3 A model of the interaction of these factors shows how they result in women's use of health services (see Diagram 3). This model suggests that permission and ability interact with need to result in demand for health services. Where this demand overlaps with availability (i.e., supply), use of health services occurs. In the Indian context, while need is large, it is 'qualified' by perceptions of illness and women's conditioning to tolerate suffering, i.e., "perceived need" is smaller. Severely constrained permission and ability restrict demand by women for health services. Effective demand - or use of health services - is further reduced by the inadequate fit between needs and services available.

6.4 The preceding discussions of mortality and morbidity have highlighted the effects of these social and economic factors on women's health. The issue of improving women's access to health care amounts to a need to make women's use of health services commensurate with their health needs. This section first considers issues on the 'demand side' and then supply-side issues which are critical to this aim.

Figure 7



B. Differential Treatment

6.5 Despite higher morbidity and malnutrition among females, they receive less health care than males. As discussed above, cause-specific mortality data reveal that female mortality from the common, major diseases is consistently higher than that of males. Although these diseases are easier to recognise and are diagnosed more frequently among females, they are also fatal more often among females because of failure to treat them.

6.6 Several micro-level studies also support this interpretation directly with comparisons of male and female treatment rates. Dandekar's (1975) early survey covering 37,000 people in rural Maharashtra revealed that although higher percentages of girls were ill than boys, lower percentages received medical treatment in the under-15 group. Among adults as well, a greater proportion of ailing women than men received no treatment, and those women who were treated received mostly home remedies or traditional medical care, while men received treatment at institutions.

6.7 Large differences in treatment of girls and boys were also observed in the Narangwal study in the Punjab (Kielmann et al., 1983). While 48% of female children were treated in the first 24 hours of their ultimately fatal illnesses, 64% of boys were. Das et al. (1982) observed that girls in the Punjab are taken to less qualified doctors than are boys, and Das Gupta (1983) found that expenditure on medicines was higher for boys than girls,

particularly during infancy and among better-off families. Among infants, about two-and-a-half times more expenditure was incurred on medicine for boys. Among all 0-4 year olds, the ratio of expenditures for medicine for boys to that for girls was 1.2 to 1; it was higher among the landless (1.55 to 1) than among the landed (1.10 to 1). (Das Gupta also found that, in all groups, expenditure on clothing for boys was one-third to one-half greater for boys than girls, another significant 'care' factor.) In fact, in the Punjab, better and more timely medical treatment may be the most important factor explaining high survival among males compared with females, as earlier studies showed (Singh et al., 1962; Kielmann et al., 1983).

6.8 Miller (1981) lists several studies of hospital admissions in different parts of the country which demonstrated higher ratios of male to female admissions in hospitals in the North (i.e., 2.1 to 1) compared with the South (1.3 to 1), although boys were favored in all areas. This is explained by the cultural "belief" that scarce resources of time and money should not be spent on girls or women who must 'tolerate pain and suffering which are their lot.'

6.9 Hospital and clinic attendance records invariably show a preponderance of males receiving treatment. The proportion of medical treatment provided to women is lower whether one considers out-patient attendance or indoor admissions. For example, in Safdarjung Hospital, Delhi, only 35% of admissions were female (Ghosh, 1985). Similarly, Khan et al. (1983) reported that a larger number of males were treated at the Primary Health Centres they studied in Uttar Pradesh, Gujarat and Rajasthan. A study of Primary Health Centres in Rajasthan revealed that five men received medical treatment for every woman (Murthy, 1982).

6.10 These findings are even more significant in the light of reports from household surveys that more women than men report illness. In Uttar Pradesh, Khan et al. (1983) found more episodes and longer durations of illness among women than men in the 20 families they studied closely. They noted that, despite this, female morbidity is likely to have been underestimated because women were "shy" to reveal illnesses or purposely downplayed them to avoid disrupting domestic duties and avoid seeking medical care. As this study and others have noted, the result is that women tend to seek medical help only at advanced stages of illness, which greatly reduces their chances of survival. This is corroborated by hospital data which show that case fatality is higher among female patients admitted. In a study of two Bombay hospitals, the proportion of females admitted who died was somewhat higher than for males (Kynch and Sen, 1983).

6.11 These low treatment rates exist despite the availability of free government health facilities in both rural and urban areas. Khan et al. (1982) found that in the Uttar Pradesh villages they studied, treatment was sought from the nearby Primary Health Center (PHC) or government health facility in only 9% of female illnesses. The vast majority of women simply used traditional remedies. A household health survey in Madhya Pradesh found that while treatment had been sought for about half of all reported 'current serious illnesses,' only 15% of patients had approached government facilities, the remainder seeking private allopathic or traditional care (Jesudason and

Chatterjee, 1979). Besides the actual costs plus opportunity costs of travelling to and waiting around public health centers, poor knowledge of the health services available appeared to be a serious constraint to their use. Only one-third of the women respondents knew the location of the nearest sub-center and about 40% the location of the nearest PHC. Knowledge of the working timings of these facilities was even poorer. Only a quarter of the women had actually ever visited the local sub-center and less than 20% the PHC itself.

6.12 Nor do women attend sub-centers or PHCs for antenatal care or for delivery (Jesudason and Chatterjee, 1979; Jeffery et al., 1984; Khan et al., 1982, 1983). The latter group of researchers have reported that between 3 and 11% of pregnant women interviewed in Bihar, U.P. and Rajasthan received MCH services such as antenatal check-ups, tetanus toxoid, iron fortification, birth attendance, or post-partum family planning counselling (Khan and Prasad, 1983b; Mehta et al., 1986). In Kerala, almost 40% of women received the first three of these services, but fewer obtained the last two. The best coverage rates were found in Gujarat where 35-43% of women received the various services.

6.13 Official statistics maintain that three-fourths of deliveries in rural areas are conducted within homes with the help of female relatives, friends or traditional dais, but micro-level studies generally report proportions closer to 90-95% (e.g., Jeffery et al., 1984). Dyson and Moore (1982) have pointed to geographical differences in birth attendance by trained personnel: it is lowest in the North and North-West, and highest in the South. This pattern coincides with the status of women in the different regions and is inversely related to mortality. However, a recent study by Ramalingaswami (1987) in the southern state of Andhra Pradesh found that only 2% of women in tribal villages and 24% in non-tribal villages were delivered by an Auxiliary Nurse-Midwife (ANM) or at a hospital, and 16% and 62%, respectively, received tetanus toxoid in the prenatal period. In contrast, over 95% of all women had been approached for family planning, and everyone knew about the malaria worker. Ramalingaswami concluded that while great differences exist in the reach of government services in rural areas, where there is a desire to reach women (e.g., for family planning), the services succeed in doing so.

C. Mother's Access to Child Health Care

6.14 In the absence of more robust, national data on women's use of health services, one must make use of indirect indicators. One such indicator is infant mortality. In a 'bio-social' sense, the infant is an integral part of the "mother-child dyad." Thus, infant mortality can be a useful yardstick of mothers' (Note: not women's) access to health care, health knowledge and also 'health goods.'

6.15 The use of infant mortality as a proxy for women's access to health care is also appropriate from the point of view of the health system as women's health services in India have been largely subsumed into "Maternal and Child Health (MCH) Services." While the practice of universal marriage and tendency of rural Indian women to bear a child as soon as possible after

marriage may render the terms "mother" and "woman" almost synonymous after the age of 25 years, the assumption of maternity is clearly unsatisfactory from the standpoint of women's health. (However, this issue is discussed separately below.)

6.16 In Appendix D, an analysis of infant mortality is provided which reveals some key determinants of women's access to health care. Data from the Survey of Infant and Child Mortality (Office of the Registrar General, 1981) show that infant mortality is highest where medical facilities are unavailable, and trained birth attendance is low. The availability of services stimulates their use by mothers at least for the purposes of child health care. Household economic levels and female education are important mediators in this process.

D. Female Education: An Important Determinant of Health

6.17 In addition to the nation-wide survey, other evidence points to the importance of female education for health. At the macro-level, cross-national studies show high correlations between female literacy and life expectancy at birth, higher than any other factor (United Nations, 1983). A review of studies from around the world supports the inverse relationship between infant mortality and mothers' education (Cochrane, 1980). Analysing Nigerian data, Caldwell showed that mothers' education was a more important determinant of child mortality than mothers' age, place of residence, or socio-economic status, fathers' education or occupation, income, or even access to health facilities (Caldwell, 1975 and 1979; Caldwell and McDonald, 1981). In Bangladesh, D'Souza and Bhuiya (1982) reported that mortality rates among 1-3 year-olds with mothers having no education were five times higher than among those whose mothers had seven or more years of schooling.

6.18 The mechanisms whereby women's education results in lower child mortality have been the subject of some speculation. As child health and survival are enhanced by better hygiene, improved nutrition and feeding practices (of the child as well as of the mother) and timely medical intervention, education may improve women's practice of any of these. Levine (1980) has suggested that schooling is a form of "assertiveness training" which enables women to take independent decisions and act on them. Although intra-household decision-making processes regarding health are still largely unknown and unexplored, the assumption is that an educated woman can take greater responsibility for her children's health and is permitted to pursue appropriate strategies by other household members. D'Souza and Bhuiya's (1982) in-depth investigation in Bangladesh showed that household decision-making processes do indeed change with the education of women; the result is that greater shares of household resources are available to children and women.

6.19 It is worth recalling here that within the household women are the main health care providers. Traditionally, intra-household tasks related to health and nutrition have been exclusively the preserve of women (e.g., provision of nourishment, maintenance of hygiene, care of children and of the sick, and so on). Because of these multiple responsibilities, one might

assume that women make the decisions concerning health matters within the household, but there is little empirical evidence of this. Moreover, there is a major and very disturbing discontinuity with regard to women's role in health care provision: while they provide health care inside the household, their own access to health care outside is severely limited.

6.20 The issue of women's education has been discussed at length in the context of child health, and it would be reasonable to assume that it would have a similar positive effect on their own health. As example, one of the most important correlates of female education is reduced fertility. Education may also benefit both women's and children's health through its impact on child-bearing behavior (see the section on Fertility, above).

6.21 Particularly when it comes to child nutrition, mothers' knowledge may be more important than income. Sen and Sengupta's (1984) study of two villages in West Bengal showed that children of literate mothers fared better in terms of nourishment than those of illiterate mothers. However, these authors contend that "literacy and prosperity go hand in hand," as the beneficial effect of mothers' education was greater in the village where there was a higher degree of "urban integration." In Das Gupta's (1987) study of Punjabi villages, women's education was associated with reduced child mortality. However, she found that education increased the discrimination against higher birth-order girls, perhaps because more educated women desired smaller families with only one daughter.[2] Bairagi (1980) studied the relationship between child nutrition and factors such as family income, maternal education, and birth order. He found that income was not the only constraint on nutritional status, even in the lowest income group. Maternal education significantly influenced nutritional status, as did the child's sex and birth order. A literate mother used scarce resources more effectively for her child's welfare than did an illiterate mother with higher income.

6.22 A general conclusion emerging from these findings is that while a minimum level of income is necessary to ensure child nutrition and health, income alone is not sufficient to guarantee child survival. This strongly highlights the need to emphasize women's employment and women's education as strategies for improving health. Educated mothers and earning mothers are both believed to have greater "autonomy" which is reflected in better child care practices, including use of health services.

6.23 A few studies in India support the view that female literacy goes hand in hand with reduced mortality and perhaps better use of health facilities. Krishnan (1975) found literacy an important variable to explain differences in mortality rates in 11 states. He examined overall death rates in terms of literacy, doctor-, hospital- and bed-population ratios, per capita incomes, urbanisation, and per capita expenditures on medical and health services. While literacy was the most important factor, the health service ratios also had some explanatory power. (Health expenditure as such was not

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[2] In the Punjab, a girl's education may also increase rather than decrease the size of the dopwry required to marry her off, because education is not clearly perceived as enhancing a woman's economic value.

found to be particularly significant.) Later, Krishnan (1976) and Nair (1980) showed that the infant mortality rates in different regions of Kerala (the state with the highest female literacy rate in the country) were positively correlated with the size of the "catchment areas" of health centers: i.e., infant mortality was lowest where access to health facilities was easiest (the "lowlands") compared with areas of difficult access, or small catchment (the "highlands"). Comparing different districts of Kerala, Zachariah and Patel (1983) showed that infant mortality was most influenced by mothers' education, that household expenditure was also significant, but water and sanitation facilities less so. Social factors such as caste and demographic ones such as birth order were also important.

6.24 Kerala is clearly India's best example of the effects of women's literacy on health (although there are other, lesser known, successes -- such as Goa). Besides a range of health measures (e.g., vaccinations, sanitation, improved midwifery training, and health services) introduced in this state in the early part of this century, female education in Kerala is most widely associated with its impressive mortality and fertility declines. Indeed, it is because of high literacy that public health measures are believed to have been effective. Literacy made people more aware of health problems and possibilities, allowed their participation in popular campaigns, and created a demand for health services, which in turn stimulated supply.

6.25 Women were major participants in these processes. They exercised influence on the health and welfare of their families and succeeded in bringing about "affirmative action" in the sphere of public health institutions. The education system in Kerala was also used to further health and hygiene directly, through mandatory vaccination of school children, the teaching of health science subjects, training of teachers in hygiene, and channelling of girls into the health professions, particularly nursing. A crucial aspect of female education in Kerala is that general education went hand in hand with health education. At the same time, women's higher social status enabled them to make use of their learning within the household (despite low economic development levels relative to other parts of India) and to utilize health services which were spatially well-distributed. Trained birth attendance was an early feature of Kerala's demographic transition.

6.26 The influence of female education on health service utilisation is also important in urban settings where health services are relatively accessible, as in Kerala. Khandekar (1974) found that within middle and low income groups in Bombay, education had an impact on th utilisation of MCH services. Education affects perceptions of health needs, knowledge of health services and capacity to acquire them. Significantly, where a perception of need exists (as in the case of "nutrition" by the respondents in Khandekar's study) utilisation of the relevant service seems to follow.

6.27 In view of the evidence that literacy can bring about better health, the current low levels of female literacy and school enrollment in India have disturbing implications. Appendix E records some facts about female literacy in India, comparing it with male literacy. While literacy figures may not of themselves appear significant in a discussion of health issues, they indicate the ground that still must be covered by efforts to

provide education to the country's population, which could in turn help to bring about better health.

6.28 The persistence of regional differences in literacy is particularly troubling, especially if one assumes a lag time between improvements in literacy and health development. Table 27 presents the time required for different states to achieve comparable standards of literacy (see Appendix E for further discussion). Women in rural areas, and especially those from the disadvantaged Scheduled Castes and Tribes (see Table 28) will have limited access to health facilities as long as they lack even primary education. These trends have special significance for health because, as noted earlier, the synergism between gender and socio-economic backwardness creates greater health needs, while that between socio-economic deprivation, gender and illiteracy could mean even greater handicaps in terms of use of health services.

E. Girls' Schooling vs. Work

6.29 Low female literacy and high male-female differentials in literacy are the direct result of low female enrollment in school. This situation is engendered by a variety of social and economic factors -- which are also directly related to female health. They are briefly described below as introduction to the next section on women and reproduction and its effects on productivity.

6.30 As Table 29 shows, while the proportion of children attending school peaks at age 9, enrollment of rural girls falls off rapidly by age 14. The enrollment of urban girls also declines far more rapidly than that of urban boys. The main reasons why girls do not go to school or drop out early relate to the low status of women in society, which results in little value being attached to girls' education. This parallels the situation pertaining with regard to girls' nutrition and health care discussed earlier. In addition, for fear of sexual abuse by male students or teachers, socially conservative parents do not want to send their daughters to school when the girls approach menarche (around age 11 or 12, i.e., by the end of the primary school years). In communities where early marriage is the norm, girls are withdrawn from schools in preparation for marriage.

6.31 To the extent that girls are valued within their natal homes, it is primarily for the domestic work that they can and are expected to perform, in many cases relieving their mothers of some of <u>their</u> burden. Whether in or out of school, girls constitute important workers within their households. Table 30 shows that by the age of 10 or 11 a sizeable percentage of children not attending school are "Main Workers." Although the proportions are higher for boys than for girls, more girls are likely to be engaged in unpaid domestic work or economically "Marginal" work.

6.32 Appendix F gives some details of labour force participation among children of school-going age and young adults. Recent trends, as shown in Tables 31 and 32, have not been encouraging. The data suggest that more girls are being drawn into the labor force, while more boys are being sent to

school. In the case of girls, the opportunity cost of education is not perceived to be offset by future earnings as these would accrue to the girls' marital families. The opportunity cost is an especially serious constraint to education among the poor. In addition, the direct out-of-pocket cost of clothes, books, stationery, and so on may be well out of the reach of poor families. Thus, girls in low-income families may fail to benefit significantly from the free education system, and their absence from school deprives them of any school meals and health check-ups provided.

6.33 The 15-19 year age-group experienced the highest growth rate among female workers, and although the marital status of the new entrants into the labor force is unknown, one can hypothesize that increased work-force participation goes hand-in-hand with delayed marriage. In fact, the pattern of work-force participation among young females fits with state-level differences in girls' schooling and increases in the age at marriage. Generally, participation in North India is lower than in the South and South-West where female participation in household and non-household industrial work is highest.

6.34 The implications of these work patterns for health have already been drawn. Here, they are used to illustrate the concomitance between schooling and work participation, which combine to exert an influence on health. The occupational distribution of girls and boys in rural and urban areas, shown in Table 33, are in keeping with the gender-segregation of tasks and the underlying reality of high illiteracy among female workers which consigns them to low-paid, unskilled jobs compared with males.

6.35 To summarize, low female literacy negatively affects the potential of women finding employment in better paying work, and these two factors -- poor education and low-paying work -- together influence their health status and that of their families. Both women's education and employment exert a positive effect on their "mothering" capabilities -- i.e., the health and survival of their children -- because a mother's own income is more likely to be spent on food and other health-related goods and services and/or because women employed outside the home are exposed to ideas and knowledge that improve their child care, participate more effectively in intra-household decision-making, and are more aware of health services and use them more frequently. Moreover, where women are potential wage earners, <u>female</u> children receive a higher share of household resources than where women are considered economically unproductive. The economic productivity of women in adulthood is, thus, an important determinant of female and child survival.

6.36 Education and employment also influence female age at marriage as well as childbearing patterns. A recent analysis of literacy rates and their correlate variables at the state level found that the female literacy rate is strongly related to the mean age at marriage and to the use of contraception. It is moderately related to non-agricultural/non-household industry employment and weekly to female work participation rates. Higher female literacy is strongly related to lower infant mortality, lower marriage rates, lower birth rates and lower total fertility rates (Office of the Registrar General, 1987). Thus, women's education clearly extends their capabilities beyond their traditional roles as wives and mothers.

F. Family Planning Practice

6.37 Much of the discussion in preceeding chapters on the interaction of women's status and their own/their household's nutrition or health (family welfare), is applicable to the practice of family planning. Only a few points will be made here in view of the voluminous descriptive and analytical literature already available on the subject.

6.38 Behind the national contraceptive prevalence rate of 35% (1980) lie wide variations between regions, socio-economic groups, etc. (Khan and Prasad, 1983a). Factors such as income, education, number of living children, and age are known to be important determinants of knowledge and use of contraception. One-third or less of women who are under 30, or have two children or one son, or are illiterate practice any form of contraception. Rates rise over 50% among women over 39, those with four or more children or two or more living sons, or matriculates (10 years of schooling).

6.39 While an "occupation" variable is often included in studies of family planning acceptance, data are usually collected on the male head of household. The wives' education and occupation may also be examined, but the interaction of women's toil in productive and domestic work with family planning decision-making or practice has not been assessed. Nor has contraceptive practice been looked at from the point of view of women's health (in India), i.e. whether it increases/decreases with women's health; how it actually affects women's health, and so on. Thus, our understanding of family planning within the context of women's health or productivity or both remains incomplete.

6.40 Contraception rates are low for numerous reasons, among which the most important are: high desired family size (atleast 4, compared with the official recommendation of 2) and son preference, high child mortality and low access to MCH services, low awareness of contraceptive methods, and poor availability of spacing methods. Insufficient attention in the design and execution of the government's family planning program to the sociology of family-planning decision-making within the household (e.g. the role of the "patriarch" and the mother-in-law), and to overcoming the constraints facing women in particular (e.g. seclusion, time and distance to health centres) continue to keep demand for family planning low.

6.41 On the other hand, there is often talk of "unmet demand" due to improper planning or the inefficiency of services. The emphasis of the official family planning program on terminal methods and pre-occupation with numerical targets, at the expense of 'MCH-based family planning' and quality of care are well-known.

Chapter VII: Health Services for Women

A. Available Health Services

7.1 In the planning of governmental health services in India, "women's health" has been considered synonymous with "Maternal and Child Health" (MCH). Over the past four decades, the planning of MCH services has received considerable attention as the need to reduce excess mortality and morbidity among mothers (sic) and children has been consistently recognized. The pyramidal health service structure which has been established in both rural and urban areas has incorporated MCH services at all levels. While the following services are reportedly established throughout the country, serious problems of implementation have hampered their effeciveness.

7.2 At the village level, briefly-trained Volunteer Health Guides (VHGs) have been entrusted with providing basic treatment of common ailments, health education, and some simple disease control tasks such as chlorination of drinking water sources. In addition, traditional birth attendants (dais) are trained to provide pre- and post-natal care and to conduct modern, aseptic deliveries (using pre-packed sterile delivery kits). Both these workers are to provide referral services to the next level.

7.3 Multi-Purpose Workers (MPWs) at Sub Health Centers (1 per 5,000 people or roughly five villages), particularly Female MPWs (MPW-Fs), or Auxiliary Nurse Midwives (ANMs), as they were earlier known, provide pre-natal, intranatal and post-natal services, basic child health care and family planning services. Ninety percent of health problems are intended to be dealt with at or below this level, the remaining 10% being referred to Primary Health Centers (PHCs).

7.4 Until recently, the norm was 1 PHC per 100,000 people (or one per Community Development Block).[3] The current norm is 1 PHC per 30,000 people, which is proposed to be established by the end of the Eighth Five-Year Plan (i.e., 1990), and one Community Health Center (CHC) per 100,000 people. At the PHC, two or three Medical Officers are assisted by a paramedical staff of 15 to 20 persons, including Public Health Nurses (PHNs), Lady Health Visitors (LHVs), Block Extension Educators (BEEs), and so on, to provide both center-based and outreach services to the villages in their jurisdiction. The proposed CHCs are to have specialist facilities in obstetrics and gynecology, pediatrics, etc. The system of specialist care extends upwards to secondary and tertiary facilities in the form of Taluk, District and Sub-Divisional hospitals and larger municipal hospitals in the cities.

7.5 In the establishment of this health system, the major strategies for the provision of MCH services have been: (1) the training of Auxiliary Nurse Midwives (now Female MPWs) and their deployment at Sub-centers; (2) the provision of specialized medical services, e.g., in Obstetrics and Gynecology,

[3] There are vast differences among the states in the density and reach of the existing health care structure reflected in a variety of indicators that relate key health services to population (see Table 34).

at PHCs, including the posts of one female Medical Officer and two certified nurses; (3) the establishment of "maternity beds" in hospitals at all levels; and (4) the training of village dais and VHGs to provide domiciliary services. The system consists, thus, of a combination of fixed facilities (2 and 3) and outreach schemes (1 and 4) which are intended to deal with the majority of health needs.

7.6 MCH services are also rendered at the village level by a trained Anganwadi Worker (AWW), together with health staff, under the Integrated Child Development Services (ICDS) Scheme. ICDS combines basic health care with supplementary nutrition for children and pregnant or lactating women and preschool education services. The nutritional feeding provides a small subsidy to families of undernourished children, and the day care services can relieve women for a few hours each day of the burden of child care. In addition, ICDS provides another forum for the delivery of health services and health education, with the potential of reaching into village homes. Other than the AWW, the health services are delivered by the same network of health workers and centers described above.

B. Impediments to Women's Access to Health Care

7.7 Despite these opportunities, some major conceptual inadequacies and a host of practical ones have prevented the health system from dealing successfully with women's health issues. These are briefly identified below.

Critical Practical Problems

7.8 Auxiliary Nurse Midwives. Although the ANM is the key women's health functionary, many problems hamper her effectiveness. Inadequate facilities (and other social/personal problems) dissuade ANMs from residing at their village headquarters, so that they are not always available to women when they are needed or even to the extent planned. In their outreach mode, they are unable, for these and other reasons (e.g., geography), to cover their target populations with the range of services entrusted to them.

7.9 There are shortages of ANMs to staff Sub-Centers in most states. Their wages are low and working conditions poor. Young and inexperienced when they first enter service, ANMs remain professionally underdeveloped for lack of adequate in-service training and supervision. They are diffident, physically insecure, and often exploited by male members of their communities. These problems compound to keep their status low which prevents them from dealing effectively with the women they must serve. The problems of low pay and low status also affect other women health workers, including village HGs and Anganwadi Workers in the ICDS scheme. Besides the need for improvement on these fronts and for accommodation, safety and proper infrastructure, ANMs, as well as other female health workers, require psychological and motivational support.

7.10 One of the foremost problems faced by ANM's MCH work is the health system's emphasis on peripheral workers having to meet family planning targets (so that higher-level facilities can in turn meet theirs, e.g., PHCs, District

Health Officers, etc.) The fact that failure to do so is punishable, results in little other MCH work being done (leave alone women's general health care). There are neither incentives nor penalties (and no targets) associated, for example, with distribution of iron-folate tablets, antenatal check-ups, or even immunization (on which there has been a great deal of emphasis recently).

7.11 Within the family planning subsector itself, the heavy emphasis on sterilization has ignored the social demands on women and denied them access, for example, to birth spacing methods. The application of "the small family norm" to poor rural household where there is a high risk of child death on the one hand and a high demand for children on the other requires re-examination. In this context, women's paramount concern would be to ensure healthy children and their own health. Contraceptive services need to take the place of abortion, for which women still go to village "quacks." Where adopted, family planning services require follow-up and clear linkages with health care.

7.12 Trained Dais. Despite its coverage of every village in the country, the Trained Dai scheme has fallen short of expectations. This is in part because of the low social status of dais in certain communities, where they are regarded primarily as sweepers who clean up after childbirth. This has denied them the potential of becoming true community health workers (even for obstetrics alone). There are also systemic inadequacies with respect to the quality (and quantity) of their training and their support. As a result, three-quarters of births in rural areas and one-third in urban areas continue to be attended by 'untrained' persons. This program has been typically supply-oriented, failing to create demand for the special skills of trained birth attendants; hence, it has encountered numerous problems emanating from traditional beliefs and practices surrounding childbirth.

7.13 In the recent past, two innovations have been introduced in limited areas which appear to have had some impact. One has been the provision of safe delivery kits to mothers so that at the time of delivery, whether a dai is present or not, the umbilical cord can be cleanly cut and cared for, in order to reduce the risks of neonatal tetanus. The other is the provision of additional incentive money to dais to attend and report births. However, the potential to reduce maternal deaths, which depends largely on referral to more skilled personnel and facilities, is not being met.

7.14 Village Health Guides. The Village Health Guide (VHG) scheme has been limited in its ability to reach women because of the failure of most states to recruit female VHGs. In addition, VHGs are paid only a token honorarium and, hence, do not take their work seriously. In some areas, e.g., in blocks covered by ICDS, other village-level health workers fill the void to some extent, but a rationalization of the system has yet to take place.

Key Conceptual Inadequacies

7.15 MCH services cover women in the reproductive age group (15-45 years) and their children under five -- and they view women only as mothers or potential mothers. Particularly at health centers, the general health problems of women have been subsumed into disease categories which are dealt with by 'general' health staff rather than "MCH" staff. However, in the rural

Indian context, women's lack of "permission" is largely rooted in strictures against contact with male health personnel. Therefore, for attention to non-maternal aspects of women's health, the interactions of MCH staff must be increased to include all women, regardless of their reproductive status (including female children and adolescents who are at a cultural disadvantage), and to address the general health problems of women which underlie high female mortality.

7.16 The location, nature and quality of services must be made commensurate with existing health problems and needs. To date, the planning of services has been 'norm-based' rather than need-based. Because of the uniform use of general population denominators despite cultural and geographic variations, the availability of health services for women cannot be inferred from the usual statistics of health facilities and manpower. Data on allocations for, or expenditures specifically on, women's health services are also not available nor deducible. Hence, calculations of actual health service coverage are currently difficult to carry out. In order to make the system more responsive to women's needs, it is necessary to gather information on the general health problems of women, other women-specific health problems, women's utilization of health services, and women's attitudes to health problems and services through community-wide surveys.

7.17 Severe regional differences in manpower and service availability need to be addressed. Besides the shortage of ANMs discussed above, the country's output of certified nurses is also far below requirement, and the majority of them work in urban areas. In a peculiar reversal of rational health manpower policies, there are two doctors for every nurse in India. Almost four times the current number of nurses are required. However, there are insufficient numbers of women doctors. While some women will approach male doctors for general complaints, the examination or treatment of gynecological or obstetric problems require the presence of a woman doctor. Thus, with the inadequacy of "lady doctors" at the PHC level, most "women-specific diseases are neglected. In general, the North-Central states (Bihar, Uttar Pradesh, Madhya Pradesh and Rajasthan) suffer from the greatest shortages of health personnel and facilities. These are also the states with the highest mortality, lowest literacy and greatest poverty. In particular, health resources in these states need to be channeled to the primary health sector and to women's health care.

7.18 While the major responsibility of the health system lies in thus extending availability, it must also help bring about changes in the areas of ability and permission. Outreach workers fail to reach into homes, to overcome the constraints of lack of permission and ability facing most rural women, and to impart preventive and promotive health care. Since institution-based care currently remains inaccessible to the majority of women and children and since the purpose of outreach schemes is specifically to overcome the constraints faced by women in approaching (socially or physically) distant health centers, these workers must be deployed in such a way as to provide services "at the doorstep."

7.19 There have not been adequate efforts to improve awareness of health services and to create demand for them (i.e., to encourage their use)

through information and education. Little knowledge exists of preventive services such as immunization or antenatal care, and health education is rarely taken seriously by providers or clients. "Access" has also to do with perception: the public must be educated about health and disease and about prevention and treatment, especially of women's problems, in order for services to become accessible to them.

7.20 The attitudes of service providers and policy-makers towards women require considerable change. They must view women as producers -- not just reproducers. Women's health has been regarded as a welfare issue, their economic roles largely being ignored. For that matter, inadequate attention has been paid even to their roles as unpaid domestic workers, providing health care within households. At the level of the health center, one result of failing to consider women as workers is the delay in giving them attention, which is ubiquitously reported by household surveys of women's experiences of health service provision. This greatly increases the opportunity costs to women of seeking health care so that they are discouraged from doing so. Visit routines of outreach workers also often fail to take into account the fact that their clients may be out to work -- so that coverage is further reduced.

7.21 Although designed to cater to pregnant and nursing women, national nutrition programs such as the Integrated Child Development Services Scheme (ICDS) fail to induce women to attend -- mainly because they ignore the social strictures against women eating in public, their need/inclination to share food with other household members, their lack of time, etc., i.e., their "household context and roles" (see Chatterjee, 1988, for a fuller discussion). Women who do attend supplementary feeding programs may face "substitution" at home, i.e., they may be denied their household share of food. Thus, the mechanics of supplementary feeding schemes must pay greater attention to the household situation, if pregnant women are to receive even the very small supplement of 500 calories envisioned for them.

Part C. Points of Intervention

Chapter VIII: Points of Intervention

A. Introduction

8.1 The National Health Policy enunciated in 1982 has identified goals for the reduction of mortality among different age groups, though these are not separately specified for males and females (GOI, 1982). The infant mortality rate is to be brought down from 125 per thousand in 1978 to 60 per thousand by the year 2000. The crude death rate is targeted to come down from 14 to 9 per thousand during this period. The maternal mortality rate should decline from over 400 per 100,000 live births in 1978 to under 200 in 2000. All pregnant women are to receive antenatal care, and all deliveries are to be conducted by trained birth attendants. A hundred percent of pregnant women and school children are to be immunized against tetanus, and 85% of the relevant target groups are to receive DPT, Polio, BCG and DT immunizations. As a result of these improvements in health, life expectancy for both males and females is expected to increase to 64 years by the year 2000.

8.2 The health policy also puts forward goals of a net reproductive rate (NRR) of 1 and a crude birth rate (CBR) of 21 per 1000 by the year 2000. It is also expected that the average number of children per family would decrease from 4.4 (in 1975) to 2.3 in 2000 in order to stabilize India's population.

B. Areas for Action

8.3 While the National Health Policy recognizes the failure of the existing health system to reach women, especially in rural areas, it does not specifically discuss women's health issues, nor does it recognize the importance of improving women's health in the context of increasing national productivity. It aims to rectify the problem of inadequate reach through a "comprehensive primary health care approach," with special attention to maternal and child health services and to nutrition and immunization programs. It lists women as target beneficiaries for several specific services such as antenatal care, immunization, etc.

8.4 In fact, increasing women's access to health services is critical for the achievement of the postulated mortality, morbidity and fertility reduction goals. The policy's underlying strategy (the "primary health care approach") and its priority areas (e.g., nutrition) call for a woman-centered approach to health care delivery. If its goals are to be achieved, there is a need to work on both the supply and demand sides to improve women's access to health care.

8.5 There are a variety of possible points of intervention. They can be readily identified by referring back to the four sets of factors which determine women's access to, and use of, health services -- i.e., need, permission, ability, and availability.

8.6 The most important interventions are perhaps those focussed on reducing need, i.e., reducing the disease burden on women so that their need for health care is lessened. Obviously, this entails improving women's access to health-producing goods, such as food, water, housing, clothing, and sanitation, directly. Indirectly, access to these 'goods' must be increased by improving incomes, especially women's incomes and/or the share of household income that is controlled or managed by women, or expended on them. Other related measures include those which reduce environmental health hazards and occupational health hazards.

8.7 Key interventions focussing on enhancing permission are: increased education of girls (for its impact in the longer term) and, for more immediate impact, general education of the public about "women's health needs," the "value of women," etc., which will loosen social strictures on women approaching health services (and may also change perceptions of need). Increasing the availability of "female-delivered" health care close to homes is another essential and potentially-effective intervention in this regard. Indirectly, the issue of "permission" will also be positively affected by measures that improve women's ability (see below).

8.8 Increasing women's ability to utilise health services can be achieved through a combination of measures that (a) lower the opportunity costs of seeking health care, (b) reduce the direct costs of health care, and (c) increase incomes of health care seekers, particularly of women. The opportunity costs of obtaining health care for women can be reduced, for instance, by ensuring more efficient provision of services so that time is not wasted at health centers; by ensuring that wages are not lost while health care is sought/obtained; by providing easily-accessible child care facilities (creches); etc. The direct costs of health care can be lowered, for example, if health services or health insurance are provided by formal sector employers; if services are made available closer to homes so that little money is spent travelling to health centers; and so on. Increasing incomes is essential for "more sophisticated" health service costs to be affordable.

8.9 Finally, the problem of availability can be tackled by increasing health services that cater to women's health needs (broadly defined), providing these services at locations where and at times when women can utilize them, and improving the quality of these services (see below).

C. Specific Health Sector Interventions Recommended

8.10 The health sector as a societal institution needs to concentrate on improving the availability of affordable and cost-effective health services. More specifically, the above assessment of women's health and nutrition issues in India suggests that there should be a focus on the following:

(a) Improving village-level health care activities carried out by trained dais, VHGs and AWWs, and extending these to encompass women's basic health needs in addition to currently planned antenatal care, birth attendance, postnatal care and child care

services. In this context a simple and effective measure that can and should be implemented with rigor is the provision of iron-folate supplements to women of all ages (and children) in a concerted drive against anemia, a major cause of women's high morbidity and mortality and low productivity.

(b) Staffing sub-centers with ANMs trained and equipped to handle almost all women's health complaints, and deploying these workers to provide para-medical services regularly at the village level in an efficient and organized peripatetic manner. (ANMs, or MPW-Fs, would also be key personnel in the detection and monitoring of treatment of cases of severe anemia.) This is the most important level of health care provision for rural women in terms of an achievable balance between physical accessibility and technical skills. However, the full potential of ANMs can only be realized through vastly improved training (of all varieties) and much greater systemic support. In particular, ANMs must be allowed/encouraged/required to pay attention to women's health, and not just to family planning. Larger numbers of these workers are required; there is, thus, scope for the establishment of new and innovative foundation training institutes.

(c) Strengthening MCH care at (old and new) Primary Health Centers to cater to all health needs of all women (and their children), making services readily available to them, and coordinating basic health care with preventive measures such as immunization and with more complex services such as those for nutrition improvement. While the establishment of the 'new' Primary Health Centers (to cover 30,000 people each) will take time, there is a need to develop an efficient referral system from village to sub-center to PHC (and beyond).

(d) The range of community-based services should be enlarged to include girls between the ages of 5 and 15, and provisions for this age group should also be made, for example, in school health programs.

(e) As Community Health Centers are to be developed as referral institutions, appropriate arrangements should be made for women's surgical and medical emergencies -- with facilities in general medicine, gynecology, obstetrics and pediatrics. While there is a need for adequate staff (medical and auxiliary) and equipment at this level, greater attention should be paid to strengthening the lower levels of the system and rationalizing the use of services throughout the system.

(f) Establishing health statistics units at the district level to collect data on morbidity, mortality and fertility, with special reference to women (and children), and to analyze these data in order to feed them back rapidly into local health planning and program evaluation.

(g) All these steps will require increased allocations to "expanded MCH," particularly to ensure adequate provisions for personnel, for their training and for better administration and supervision. Earmarking a larger "MCH budget" within the general health and family welfare budget is called for.

(h) Within the context of nutrition programs (e.g., ICDS, Tamil Nadu Integrated Nutrition Program, etc.), greater emphasis on women's nutritional supplementation, health care and health-nutrition education is required, with time set aside by workers specifically to motivate and cater to women (for example, through home visits and center-based activities), particularly those in low-income families. To strengthen the health components of these programs, improved linkages between the village-level workers and the sub-center MPWs are required, as is integration at higher levels in the service and administrative structures. In addition, strengthening of the child care component of ICDS could also benefit women's health and productivity.

(i) Now widely acknowledged, the need to reorient the family welfare program to birth-spacing methods is paramount, with the objective of improving the availability of these methods. Ensuring the availability of safe, hygienic and humane MTP services could also decrease female morbidity.

(j) These improvements on the 'supply side' should be accompanied by the promotion of demand for services from women by putting forward a 'service for all' image of the health system, to overcome the 'gender gap' in the treatment of illness. Efforts must be made to encourage early contact between women who are ill and the health service provider at the appropriate level.

TEXTUAL APPENDICES

Appendix A: Improvements in the Sex Ratio and Mortality Declines

1. District-Level Sex Ratios

A.1 The declines in state-level sex ratios are mirrored at the district level. However, between 1971 and 1981, improvements occurred in 17 out of 38 districts where the FMR had been declining (e.g., in the heavily populated areas of North-Central India). These were districts which had particularly low ratios to begin with (Sen, 1986). In four distinct areas of the country, the district-level sex ratios manifest continuous improvement between 1901 and 1981: (1) Rajasthan, the Punjab, Haryana and Himachal Pradesh, and the Northwest border districts of Gujarat; (2) along the West coast in Kerala, Karnataka and Maharashtra; (3) a contiguous area in the Telengana region, Orissa and Madhya Pradesh; and (4) some districts in North Bengal and Assam.

2. Age-Specific Sex Ratios

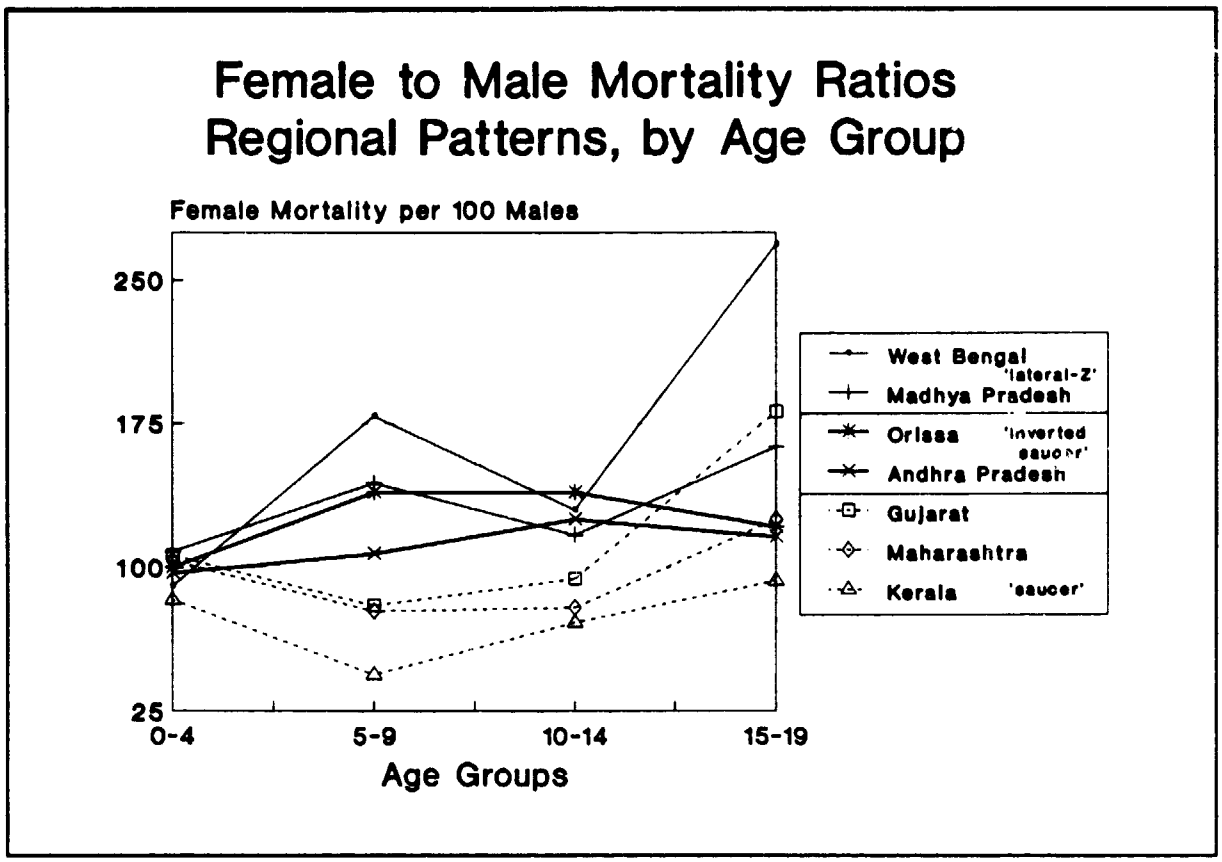
A.2 Regional differences in age-and-sex-specific death rates contribute to geographical variations in the sex ratio. Appendix Table 2 gives the state-level ratios between female and male death rates of the four youngest five-year age-groups. The data show that in most states the ratio of female to male mortality exceeds 1 in all the age-groups shown. However, the data are especially interesting because they indicate how female mortality (relative to male mortality) changes from high to lower levels between the age of 0 and 20 years. While the female/male mortality ratios are higher among 15-19 year olds than among the 0-4 year olds in all states, the ratios among 5-9 and 10-14 year olds fluctuate in such a manner as to produce three distinct patterns, shown in Figure 8 (following page).

A.3 In the majority of states the female-male ratio follows a 'lateral-z' pattern -- i.e., it rises from the 0-4 to the 5-9 year age group, falls with the 10-14 year age group, and rises again among the 15-19 year olds (and beyond, though these are not shown). These states have the highest mortality rates and differentials and the most adverse sex ratios (e.g., Assam, Bihar, Haryana, Madhya Pradesh, Uttar Pradesh and West Bengal). This biphasic pattern is especially significant for the (relatively) much higher female mortality among 5-9 year olds, despite low overall death rates at this age.

A.4 In the second group of states (Andhra Pradesh, Karnataka and Orissa, which have higher sex ratios) the differential among the 5-9 year olds is lower, so that the curve is shaped like an inverted saucer.

A.5 In the third group, mortality among 5-9 year-old females is actually lower than among males in the same age-group (i.e., the female/male mortality ratio is less than 1), and the ratio is also lower than that among

Figure 8



10-14 year olds, resulting in a curve shaped like un upturned saucer. Although these states (Gujarat, Kerala, Maharashtra, Punjab, Rajasthan, Tamil Nadu) currently have a mixture of adverse and favorable FMRs, one might surmise that they are 'in transition' in terms of improvements in young female survival.

A.6 These 'transitions' may have different causes in different areas. For example, in the Punjab and Maharashtra, improvements in the relative survival of 5-9 year old girls may be related to their enrollment in school, while in Rajasthan it may be due to their increasing 'value' as unpaid domestic workers as their mothers increasingly go out to work. The relatively low mortality rates of 10-14 year olds in all states may be explained by a favorable ('wanted') status enjoyed by surviving daughters in their natal homes compared, for example, with the next five-year age-group of girls who are exposed to the social and biological risks of early marriage and early childbearing (see Chapter 4).

3. Male:Female Mortality Decline

A.7 According to Dyson (1987), a "cross-over" from higher female to higher male mortality is likely to have occurred in the early 1980s in the

states of Karnataka, Maharashtra, Orissa, Tamil Nadu, West Bengal and Himachal Pradesh. Conversely, excess female mortality will persist for some time in the high mortality areas of Bihar, Gujarat, Haryana, Madhya Pradesh, the Punjab, Rajasthan and Uttar Pradesh -- yet even in these states the differential is narrowing. In the Punjab and Haryana, the differential is expected to remain the longest (significantly, despite the comparatively high level of economic development in these states).

A.8 However, future trends in 0-4 year mortality (ASDR) at the state-level are projected to be slightly different. Dyson (1987) has grouped the states according to the following likely scenarios:

Kerala, Tamil Nadu	Already slightly higher male ASDR.
Andhra Pradesh, Karnataka, Maharashtra, Orissa	Magnitude of sex differential small, but no indication as yet of further narrowing.
Bihar, Gujarat, Punjab, Rajasthan, Uttar Pradesh and (probably) Haryana	Greatest excess female mortality, but some improvement taking place.
Madhya Pradesh	Among states with the highest excess female mortality; appears to be worsening (?)
All-India	Female ASDR still exceeds male ASDR, but the sex differential is narrowing.

A.9 Reductions in the mortality of different age groups have contributed variously to increases in life expectancy over time. According to Ruzicka (1984), between 1941 and 1970, reductions in infant and child mortality accounted for roughly 40% of the increase in life expectancy. Declines in the mortality of 5-14 and 15-44 year-olds contributed about 14% and 27% to increased life-expectancy, respectively. The remainder of the increase in overall life expectancy was due to reductions in mortality above the age of 45.

A.10 Ruzicka also calculated changes in the risks of dying at different ages. For a male infant, the probability of dying declined by 33% between 1941 and 1970, for a female infant by only 23%. However, mortality risk among 1-5 year olds declined somewhat faster for females than for males in this period. On the other hand, the probability of dying between 15 and 30 years of age was reduced by almost 50% between 1941 and 1970, for both males and females. A somewhat smaller improvement occurred in the 35-55 year age group.

A.11 During the 1970s, mortality declines were generally slow, and there appears to have been little improvement in adult mortality during that decade. In rural areas, mortality among the 0-4, 5-9 and 10-14 year age groups changed little, although there were slight but steady declines in urban

areas. There may have been some decline in rural female mortality in the 10-14, 30-39 and 45-54 year age groups, but this seems to have been partly offset by increases in mortality among 25-29 year old females (Ruzicka, 1984).

A.12 Until 1970 male mortality was below female mortality for all ages up to 50, but by 1985/86 the "cross-over point" from higher female to higher male mortality had shifted downward to 35 years. Beyond age 35, in both rural and urban areas of all states (possibly excepting Tamil Nadu), a "secondary sex differential" exists: that of higher male than female mortality (Dyson, 1984). (In urban areas, excess male mortality may, in fact, begin at age 25.) Male mortality after age 35 is higher than among younger men; it also is higher than among non-Indian male populations over 35. Thus, the "excess" male mortality after age 35 does not result from unusually low female mortality, but from the comparatively high mortality among males.

Appendix B: Further Details of the Relationship between Female Economic Value and Survival

1. Female Employment and Survival

B.1 Rosenzweig and Schultz (1982) undertook a two-stage regression analysis of an all-India sample of rural households and demonstrated, first, a correlation between rainfall (i.e., wetland cultivation) and women's employment, and then, a negative correlation between female employment and the male-female survival differential (i.e., higher female employment decreased the difference between survival rates of boys and girls). They also found that a rise in adult male employment exacerbated child preference between boys and girls in favor of boys.

B.2 Agarwal (1986) has added a 'future dimension' to the analyses of women's survival and economic value, based on trends in agricultural growth and the incidence of poverty. She contends that the Northwestern states, particularly Punjab and Haryana, which have experienced the largest increases in agricultural production and have the lowest incidence of poverty in India, have not seen increases in employment opportunities for female agricultural labor commensurate with the rise in the supply of labor, so that male/female differentials in total earnings have increased. She interprets these trends, as well as other evidence of increasing social bias against females in these states (e.g., the rising demand for fetal sex determination tests so that female fetuses can be aborted ; increasing dowry and marriage expenses, and the resurgence of sati, widow-burning) as having further adverse implications for female survival.

B.3 However, while the generalities of Agarwal's hypothesis may be correct, there are some specific aberrations in the trends she predicts. For example, male-female wage differentials have actually decreased in all states between 1970 and 1985 (Jose, 1988). The implications of these for female survival are difficult to discern at the current time.

B.4 In the Eastern states of Orissa and Bihar, agricultural stagnation and the high incidence of poverty (which have led to male outmigration) have increased female work participation as agricultural labor, and the incidence of female-headed households. However, Agarwal suggests that even in this region where female survival has been relatively better, greater unemployment may result in increased gender discrimination over time.

B.5 In the South, which falls somewhere between the North and the East in terms of both agricultural modernization and the incidence of poverty, lower intra-household discrimination against females may be further reduced due to a reduction of male/female earning differentials. However, the situation is tenuous, as increases in the practice of dowry and the threat posed by mechanisation to agricultural labor (particularly of females), may have negative effects, so that the net influence on female survival is as yet unknown.

2. Female Survival Among the Poor

B.6 Holding adult female labor participation constant, Rosenzweig and Schultz (1982) found a lower ratio of female to male survival rates among the landless than among the landed in their all-India sample of households. Although, as Sen and Sengupta (1983) and Levinson (1974) have shown, this may be brought about by greater discrimination against females in nutrition among the landless (see Chapter 3), other evidence confounds this conclusion. Analyzing Census data at the district level, Rosenzweig and Schultz found that female child survival relative to male was higher in districts with higher proportions of landless households.

B.7 Using data from the Rural Labour Enquiries of 1964/65 and 1974/75, Krishnaji (1987) found that agricultural laborer households had a better balance between the sexes than non-laborer households in 1971 (i.e., estimated FMRs of 980 and 940, respectively), and laborer households without land had higher proportions of females than those with some land (FMRs of 982 and 969, respectively, in 1974/75). He further analyzed the sex ratios by age groups and showed that among 15-49 year olds, laborer households had a higher FMR than the rural population as a whole (1,000, compared with 971). There was a more marked difference in the over-50 age group. Krishnaji concluded that the sex ratio differences between economic groups arose primarily from higher adult FMRs in laborer households. (The Rural Labour Enquiries do not include data on children below 14 years.)

B.8 Krishnaji also related the sex ratio to household size, and found an inverse correlation: the higher the FMR, the lower the household size (among landless laborer households). Among landholding households, the size increased with the amount of land held, but the sex ratio nevertheless decreased as landholding increased. In sum, big landholdings and big families were associated with a large imbalance between the sexes (favoring males).

B.9 From a state-level analysis based on census data (which include children under 15 years), Krishnaji noted that even in the Punjab (including Haryana, in 1961) and Uttar Pradesh, females outnumbered males in small land-holding families (despite the large deficits of females in these states). Middle and big land-holding groups sometimes had sex ratios lower than 900, and "even in the South, where the (sex ratio) is generally high, it is low at the upper end of the land scale."

B.10 Looking at per capita monthly expenditure data, Krishnaji pointed out that despite the shortcomings of these data which he had discussed elsewhere (Krishnaji, 1984), FMRs are highest in the lowest expenditure groups, and vice versa. However, the strength of this finding is confounded by the two-way relationship that exists between per capita expenditure and sex proportions. A high female proportion may influence per capita income downwards, because of possible lower female employment and lower wages, just as high income appears to depress the FMR. Nevertheless, these trends at least do not conflict with the findings based on landholding.

B.11 Part of the 'female-favor' of the sex ratio among low landholding families (and small household size) is due to male outmigration in search of work. But Krishnaji holds that this occurred among both landless and landholding families, and among all classes of the latter, so that it does not explain the differences between these groups. One can conclude that male/female mortality differentials are key, and these are higher among better off families because of the lower relative economic value of women.

Appendix C: Regional Variations in Male:Female Differences in Dietary Intake

C.1 Harriss (1986) collated and analysed 24 household surveys of dietary intake in the Subcontinent to discern differentials between males and females by age, among different sccio-economic groups, in different regions and in different seasons. She assessed the dietary intakes of the different age-sex groups studied as a percentage of the adult male shares in each study.

C.2 In Rajasthan, all children under 12 received slightly low "shares" compared both with the reference adult males as well as with recommended intakes. This was true also of adult females. Only adolescent males and females received 'fair' and adequate shares. In Gujarat, only lactating and elderly women appeared to be relatively deprived. Data from two villages in each of two districts of Maharashtra showed that children between 1 and 3 years received low relative shares (except those from large cultivator families in the surplus season), but that older children (both males and females) up to age 18 received better shares in proportion to the recommended allowances compared with adult males. Adult females were on par or even slightly better off than adult males (in both landless and landed households).

C.3 There were several studies from the southern region. Two from Andhra Pradesh reveal the same pattern as in the Maharashtra villages -- low shares among preschool children (in all categories of families, except among the landed in times of surplus), but a more favorable situation for pre-adolescents and adolescents, both male and female, and adult male and female parity. However, the adult male ('reference') share was lower here than in any other region in this collection of studies, suggesting overall greater levels of deficit, and adult women were worse off than males in the lean season.

C.4 In a Tamil Nadu village, children between 10 and 12 appeared to receive the lowest shares while all other groups had adequate shares, including very young children. However, in another larger sample of households in Tamil Nadu, the greatest deprivation was among children under 5, but adolescents and young adults of both sexes, and especially pregnant women, were also deprived. Only among those over 50 did the proportion of actual to recommended shares appear favorable.

C.5 Finally, Harriss utilized two studies from Bangladesh to illustrate the situation in the East. Both showed a marked male-female differential among children under 4, as well as absolute shortfalls in both groups. The shortfall persisted among older children (5-14 year olds), but there was no gender differential. Once again, similar to the North-western situation, among those over 15, women suffered absolute and relative differences. The highest difference (male over female) in intake was among those over 45 years (61%) and the next highest among 15-44 year olds (29%). However, while this pattern obtained among poor families and especially in the "hard work" season, the differentials favored females under 14 in richer households, though they were still biased against adult females.

C.6 On the whole, a mixed picture of male:female differentials is obtained from these studies, which may be partly due to Harriss' method of reworking the original data. Specifically, her calculation of "relative shares" based on "recommended allowances" may be inappropriate. Recommended dietary allowances (RDA) are based on metabolic studies of large homogeneous groups of subjects, "reference" men and women, and are estimated for given body sizes, physiological states, and activity levels. Hence, it is quite possible that they are inappropriate for specific sub-populations, heterogeneous groups, or individuals.

C.7 Furthermore, the RDA may be specifically gender-biased as a result of our inadequate understanding of female metabolism at work, activity levels, or even reference body size. With regard to physical activity, some researchers have noted that measurements used for women are inadequate (Chen et al., 1981). Anecdotal evidence that male energy requirements may be lower than expected because of 'disguised unemployment' also makes Harriss's use of the adult male share as a reference worrisome. Women's "double work burden" would be relatively more difficult to disguise. Whether in the labor force or not, women undertake energy-demanding housework. As Amartya Sen has remarked, the notion that "housework" in poor countries is a sedentary activity as it is classified in energy output-totalling exercises could not be more erroneous (Sen, 1981).

C.8 Harriss has also alluded to the consumption of alcohol by males --a ready source of calories which are most likely not counted by dietary surveys. While increasing male caloric intakes, alcohol consumption may affect intra-household food availability negatively, thereby diminishing female intakes. In fact, the convergence of both these nutrition-maximising strategies is seen among male agricultural laborers in Kerala (the most nutritionally deficient state in the country) who, while frequenting the toddy shops as a source of cheap and ready calories, conserve energy by 'sitting idle under coconut palms' (Mencher, 1980; Gulati, 1981).

C.9 Finally, Harriss' calculations are rendered even more problematic when we consider that in undernourished populations, growth may be delayed because of inadequate diets in the face of unrelenting demands for work (i.e , energy output). Basing requirements on existing body weight denies the possibility of physiological compensation for being underweight so that food deprivation is conceptually perpetuated.

Appendix D: Infant Mortality and Mother's Use of Health Services

D.1 To begin with, the relationship between infant survival and mothers' access to health services is borne out by two 'macro' lines of evidence. First, the rural-urban differential in infant mortality is the most startling, attesting to the comparative lack of access of rural people (mothers) to health services. Second, where infant mortality has declined in the country (e.g., in Kerala, Goa, etc.), this has been ascribed, inter alia, to the availability and to women's use of health care.

D.2 The infant death rate in India has declined somewhat more slowly than the overall death rate, suggesting that factors that have reduced mortality have benefited adults more than children. To the extent that health services are responsible for these declines, it would then follow that adults in general have greater access to services than mothers of infants.

D.3 While the male-female differential in infant mortality has been eliminated in the country as a whole, it persists to a small extent in rural areas. Rural male-female differentials in infant mortality are greatest in the states with the highest infant mortality levels. In a study of rural Uttar Pradesh (which has the highest infant mortality rate in the country) in the 1970s, Simmons et al. (1979) drew attention to the higher mortality of male infants compared with females until the 1960s. However, in the 1970s, although almost 60% of infant deaths occurred within the first month of life when males are more vulnerable biologically, the female infant mortality rate was 223 compared with 170 for males. The authors suggested that the status of the female child was declining due to worsening poverty.

D.4 As discussed earlier, mothers seek health care more for male than for female infants. This phenomenon is culturally mediated rather than a consequence of the availability or non-availability of health services per se. however, given societal willingness to invest more in sons than in daughters, it is not unreasonable to assume that if the opportunity and real costs of seeking health care were lower for mothers, the likelihood of health care for female infants would increase.

D.5 Infant mortality can be divided into neonatal and post-neonatal mortality, that is, deaths occurring in the first month of life and in the remaining 11 months of the first year. This distinction is important because the major causes of death vary in these two periods.

- In the neonatal period, "prematurity," congenital problems, birth injuries and tetanus are major killers. Neonatal tetanus accounts for about 15% of infant deaths in rural areas, while "prematurity" results in a further 8%. Prematurity is the result of inadequate nutrition and prenatal care for mothers which predisposes their infants to low birth weight. (About 25% of all births in India have "low birth weights.") Neonatal tetanus arises from the lack of proper aseptic facilities for delivery in the absence of maternal immunization against tetanus. Poor obstetric care also results in a significant number of birth injuries.

- In the postneonatal period, infectious diseases (which include immunizable diseases, and under which lie poor hygiene and feeding practices) and malnutrition combine to cause much mortality. The major specific causes are diarrhoeal diseases, bronchopneumonias and influenza. Many of these causes of death are amenable to health service interventions, preventive or curative. Antenatal care for mothers, accompanied by tetanus toxoid and iron supplementation, proper facilities for delivery, immunization against the major childhood infections, and oral rehydration therapy are some potentially effective interventions.

D.6 The neonatal mortality rate (NNMR) and the post-neonatal mortality rate (PNMR) can, thus, serve as indicators of the use and quality of prenatal/intranatal care and nutrition-environmental health, respectively. Deaths in the post-neonatal period are believed to be easier to control because they are more amenable to simple health interventions. Thus, as the performance and utilization of health services improve, a change would occur in the distribution of infant deaths so that, along with declines in infant mortality as a whole, a higher proportion (or lower absolute number) of infant deaths would occur in the neonatal period. This is borne out by cross-national studies that show higher proportions of infant deaths in the neonatal period in countries with lower infant mortality rates.

D.6 Visaria (1985) has pointed out, however, that in India the percentage of infant deaths occurring in the neonatal period has remained relatively constant -- regardless of whether one considers urban and rural areas separately, or different states with their vastly differing infant mortality rates, or trends over time. One conclusion from this analysis is that health services are equally effective -- or ineffective -- in reaching the pregnant woman as the mother of an infant.

D.7 This is substantiated by data from the nation-wide Survey of Infant and Child Mortality (Office of the Registrar General, 1981). The Survey related death data collected in 18 states to various social and economic factors, including health care, and can thus be used to explore state-level variations in access to health services. According to the survey, only 42% of infants who died in rural areas and 65% of those in urban areas were treated by a trained medical practitioner before their death.

D.8 Analyzing associated factors, Jain (1984) found that trained medical attendance at birth had a strong positive influence on infant survival. As one would expect, it was particularly effective in lowering neonatal mortality. Although higher immunization rates were also associated with lower mortality, the influence of this factor was quite weak, in part because only a small percentage of children were immunized at all. However, neonatal and post-neonatal mortality contributed equally to inter-state variations in infant mortality, suggesting that the reduction of both these components must be pursued by health services.

D.9 At the household level, Jain found factors such as female education and the economic status of the household to be important in explaining mortality variations. Female education had a strong inverse relationship with infant mortality. In the country as a whole, illiterate mothers experienced 145 infant deaths per 1,000 live births, while those with some education had an infant mortality rate of 101 and those with primary education suffered only 71 infant deaths per 1,000 live births. In rural areas, infants of illiterate women had a mortality rate more than double that of infants whose mothers had primary school education (132 and 64, respectively). The difference was reduced in urban areas to about two-thirds higher among illiterate women (81) compared with primary-schooled women (49), suggesting that other urban factors (e.g., availability of health services) can partially offset the detrimental effects of female illiteracy on infant mortality. Among the states, female literacy varied from 11% in Rajasthan to 89% in Kerala, and the infant mortality rate decreased with increases in female education in all states (except Assam and Andhra Pradesh, where poverty may be an over-riding factor).

D.10 Lower infant mortality was also found in households obtaining drinking water from a tap or handpump, compared with well or tank sources. The basis of this relationship is obviously the greater disease load imposed by unsafe water sources, but the correlation between economic levels and access to safe water is well established. In the survey, the economic level of households was judged by their access to electricity and per capita expenditure data and was found to have a significant effect on infant mortality: the higher the economic level of the household, the lower the IMR.

D.11 Jain also considered village level factors in his analysis, e.g., the presence of a high school, the availability of a medical facility, and overall trained birth attendance. All these were found to influence infant mortality positively. While neonatal mortality was especially influenced by trained birth attendance, post-neonatal mortality was lowered by the availability of a medical facility. A model of all these factors demonstrated the inter-relationships between village development, household economic levels, and female education; and village development, availability of medical facilities, female education and trained birth attendance. Significantly, while medical facilities exerted their effect on neonatal mortality through female literacy and birth attendance, their effect on postneonatal mortality was direct, presumably through the treatment of illness. Among the 41% of villages which had a medical facility within 2 km, the infant mortality rate was 117, compared with 141 in villages with more distant health facilities.

D.12 In summary, these data show that the availability of medical facilities and of trained birth attendants are important to the reduction of infant mortality, i.e., their availability stimulates use by mothers atleast for the purposes of child health care. Both household economic levels and female education are important mediators in this process.

Appendix E: Female Literacy, and Some Comparisons with Male Literacy

E.1 Although female literacy in India has been increasing more rapidly than male literacy during the course of this century, by 1981 the female literacy rate was 24.8%, just over half of the male literacy rate of 46.9%. These aggregates disguise marked rural-urban differentials. The 1981 all-India urban literacy rate (57%) was almost double the rural rate of 30%. Only 18% of females in rural areas were literate, compared with 41% of males, while in urban areas the rates were 48% for women and 66% for men. Thus, the female literacy rate was only 44% of male literacy in rural areas and 73% in urban areas.

E.2 Just as there are vast regional differences in various health indices, there also are wide variations in literacy status. In all states, male literacy exceeds that of females, but wide variations exist in the differentials in rural, urban and combined populations (Appendix Table 6). The differences are particularly great in Uttar Pradesh, Bihar, Madhya Pradesh, Andhra Pradesh, Rajasthan and Orissa, which together account for over half of India's total population. Over time, as younger age groups have acquired higher literacy, the sex differential in literacy rates has narrowed in all states. The highest literacy is usually found among 10-14 year olds because, given the continuous increase in school enrollment, the probability that children in this age group would have received the five years of schooling necessary to achieve literacy is greatest. However, although the sex differential in literacy is lower in this group than among the general population (because of the 'catch up' being exhibited by female literacy rates), even among 10-14 year olds female literacy lags considerably behind and wide state-level variations persist. For example, in Kerala, the Punjab, Maharashtra, Tamil Nadu, Gujarat, Karnataka and West Bengal, the 10-14 year female literacy rate is over 70% that of the male rate, while in Rajasthan, Uttar Pradesh, Bihar and Madhya Pradesh it is less than 55%.

E.3 In Table 27, the rate of growth of literacy between 1971 and 1981 has been used to project the time required (in decades) for various states to achieve 85% literacy in the total population and 100% literacy among 5-14 year olds. The data suggest that it will take almost twice as long for females in India as for males (10 decades vs. 5) to achieve 85% literacy; and the achievement of 100% literacy among female children will take about 28 years longer than among males. The variations and differentials among states are even more striking. Kerala will achieve 100% literacy among 5-14 year olds 3 years earlier for girls than boys, although females will still lag behind males in the population as a whole. Rajasthan, on the other hand, will take four times as long (or 249 years!) to achieve 85% literacy among its population of females as among its males and three times as long to achieve 100% literacy among school-age girls as among boys. The large states of Rajasthan, Uttar Pradesh, Madhya Pradesh and Andhra Pradesh will take more than a hundred years to bring their populations up to the 85% literacy level.

E.4 Low literacy rates among women are in part due to low rates among major socio-economically backward groups, such as the Scheduled Castes and Scheduled Tribes. Educational development of these groups has been lower than

that of the general population (see Table 28). The literacy rate was 36.2% in the general population, but only 21.4% among Scheduled Castes and 16.4% among Scheduled Tribes. Lower rates among these disadvantaged groups hold true for both males and females and among rural and urban populations. In all groups females fare considerably worse than males -- although, interestingly, the lowest male-female differences are found among those groups which have the lowest literacy rates generally (i.e., Scheduled Tribe, Rural and Total; Scheduled Caste, Rural), suggesting that improvements in literacy tend to favor males at least initially.

Appendix F: Work Participation among Children and Young Adults

F.1 In 1981, about 14 million children were classified as "Main" and "Marginal Workers." As Table 31 shows, about 6.0% of boys under 14 years were so classified, while about 4.3% of girls were. These percentages are small because the entire population aged 5-14 is used as the denominator, even though the burden is most likely to fall on children between 10 and 14 years. While the percentage of rural boys working declined between 1971 and 1981, it almost doubled for girls -- from 4.6% in 1971 to 7.8% in 1981. When the percentage of girls to total workers is considered, the increase was almost four-fold (from 2.4% in 1971 to 8.7% in 1981), while it remained constant for boys. (The generally lower activity rates for females than for males may be due to under-enumeration.)

F.2 "Main worker" participation rates for the 0-14, 15-19 and 20-24 year age groups are given in Table 32. Several important observations can be made. Among 0-14 year old girls, the category of "Main workers" increased slightly during the 1971-81 decade, while it declined for 0-14 year old boys. This suggests that more girls are being drawn into the labor force, while more boys are being sent to school. In the 15-19 year age group, the labor force participation rate increased by 17% for females, but declined by 8% for males. This age group experienced the highest growth rate among female workers, and although the marital status of the new entrants into the labor force is unknown, one can hypothesize that increased work-force participation goes hand-in-hand with delayed marriage in this age-group. In the population as a whole, female work participation increased by 16% during the decade (although this increase partly reflects under-counting in the 1971 census).

F.3 At the state level, the largest growth rates in female work participation (including the 0-14 and 15-19 year age groups) were in Haryana, the Punjab, Orissa, Tamil Nadu and Karnataka, while the lowest were in Uttar Pradesh, Kerala and Bihar.

F.4 The age structure of the female work force differs from that of males: 8% of female workers are in the 0-14 year age group, compared with only 4% of males, and 12% are between 15 and 19 years, compared with 10% of males. Taken together, thus, 20% of girls under 20 years of age are categorized as Main Workers (compared with 14% of boys). This sizeable proportion perhaps explains high female school dropout rates, a conclusion that is supported by the higher levels of illiteracy among female workers: 84% (88% in rural areas and 56% in urban areas) compared with 50% for males (58% in rural areas, 27% in urban areas).

F.5 It has been projected that by the year 2001 work participation among 0-14 year old females will increase a by further 20% and among 15-19 year old women by 30% (Suri, 1987). Both rates will be higher than those for the corresponding age-groups among males.

F.6 Table 33 shows the distribution of girls and boys in rural and urban areas among nine occupational categories. A higher proportion of rural boys than of rural girls falls into the "Cultivator" category -- but the

reverse holds for "Agricultural laborers." Among urban boys, the percentage in non-household industry is much higher, while girls predominate in household industry. Urban girls predominate in providing (domestic?) "Services", while boys engage in "Trade and Commerce". These differences are in keeping with the gender-segregation of tasks and the underlying reality of high illiteracy among female workers which consigns them to low-paid, unskilled jobs compared with males.

Statistical Appendix

Table 1

Estimated Age Specific Death Rates by Sex, All India, 1984

Age Group	Rural			Urban			Combined		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
0- 4	44.2	48.2	46.2	22.6	23.8	23.2	39.5	43.0	41.2
5- 9	4.1	5.3	4.7	1.6	2.1	1.8	3.6	4.6	4.1
10-14	1.7	2.2	1.9	1.2	1.3	1.2	1.6	2.0	1.8
15-19	2.1	3.0	2.5	1.6	2.2	1.8	2.0	2.8	2.3
20-24	3.0	4.2	3.6	2.1	2.8	2.5	2.8	3.9	3.3
25-29	2.9	4.4	3.6	2.3	2.2	2.2	2.8	3.8	3.3
30-34	3.5	3.8	3.7	2.2	2.3	2.2	3.2	3.5	3.3
35-39	4.5	4.7	4.6	4.2	2.5	3.4	4.4	4.2	4.3
40-44	6.6	5.7	6.2	6.5	4.2	5.5	6.6	5.4	6.0
45-49	10.1	6.8	8.5	9.9	5.1	7.7	10.0	6.5	8.3
50-54	16.1	11.1	13 8	13.7	9.9	12.0	15.6	10.9	13.4
55-59	20.8	15.8	18.3	21.9	14.4	18.4	21.0	15.5	18.3
60-64	36.3	31.3	33.8	35.3	26.9	31.2	36.1	30.4	33.3
65-69	50.4	42.6	46.5	51.5	38.9	45.1	50.6	41.9	46.2
70+	112.4	106.0	109.2	104.2	93.1	98.5	110.8	103.4	107.1
All Ages	13.5	14.0	13.8	8.8	8.3	8.6	12.4	12.8	12.6

Source: Sample Registration Bulletin XXI, No. 1, Office of the Registrar General, Ministry of Home Affairs, New Delhi, 1987.

Table 2

Ratios of Age-Specific Death Rates, All India, 1984

Age Group	Female/Male Ratios			Rural/Urban Ratios		
	Rural	Urban	Combined	Male	Female	Person
0- 4	1.09	1.05	1.09	1.96	2.03	1.99
5- 9	1.29	1.31	1.28	2.56	2.52	2.61
10-14	1.29	1.08	1.25	1.42	1.69	1.58
15-19	1.43	1.38	1.40	1.31	1.36	1.39
20-24	1.40	1.33	1.39	1.43	1.50	1.44
25-29	1.52	0.96	1.36	1.26	2.00	1.64
30-34	1.09	1.05	1.09	1.59	1.65	1.68
35-39	1.04	0.60	0.95	1.07	1.88	1.35
40-44	0.86	0.65	0.82	1.02	1.36	1.13
45-49	0.67	0.52	0.65	1.02	1.33	1.10
50-54	0.69	0.72	0.70	1.18	1.12	1.15
55-59	0.76	0.66	0.74	0.95	1.10	0.99
60-64	0.86	0.76	0.84	1.03	1.16	1.08
65-69	0.84	0.76	0.83	0.98	1.10	1.03
70+	0.94	0.89	0.93	1.08	1.14	1.11
All Ages	1.04	0.94	1.03	1.53	1.69	1.60

Source: Calculated from Sample Registration Bulletin XXI, No.1, Office of the Registrar General, Ministry of Home Affairs, New Delhi, 1987.

Table 3

Estimated Age-and-Sex-Specific Survival Rates, All India, 1981-85

Age Group	Males	Females	Male-Female Difference	1981 Sex Ratio
0- 1	0.884	0.874	0.010	--
0- 4	0.945	0.930	0.015	958
5- 9	0.983	0.980	0.003	943
10-14	0.989	0.987	0.002	911
15-19	0.988	0.983	0.005	914
20-24	0.987	0.981	0.006	947
25-29	0.986	0.979	0.007	968
30-34	0.982	0.975	0.007	961
35-39	0.974	0.973	0.001	940
40-44	0.958	0.967	0.009*	910
45-49	0.940	0.952	0.012*	881
50-54	0.903	0.922	0.019*	872
55-59	0.864	0.893	0.029*	893
60-64	0.795	0.818	0.023*	1,003
65-69	0.722	0.750	0.028*	953
70-74	0.619	0.642	0.023*	(70+: 974)
75-79	0.490	0.513	0.023*	
80-84	0.288	0.303	0.015*	
All Ages				
933				

Source: Columns 1-3, from S. Guha Roy, "Population Estimates for India, Demography India, Vol.13, pp.174-175, 1984;
Column 4, calculated from Census of India, 1981, Series 1, India, Paper 1 of 1982, Final Population Totals, Office of the Registrar General, New Delhi, 1983.

Table 4

Life Expectancy at Different Ages for Females and Males, 1981 (in years)

Life Expectancy	Females	Males
At Birth	54.7	54.1
At Age 10	58.0	56.1
At Age 20	49.2	47.0
At Age 30	41.0	38.0
At Age 40	32.5	29.3
At Age 50	24.3	21.4
At Age 60	17.0	14.6

Source: Population Projections for India, 1981-2001, Paper 1 of 1984, Office of the Registrar General, Ministry of Home Affairs, New Delhi.

Table 5

Morbidity Pattern of Children in Rural Tamil Nadu

Disease	Percentage of Males (n=176)	Percentage of Females (n=144)
Riboflavin deficiency	30.4	35.4
Iron deficiency	29.9	33.5
Respiratory infections	27.3	55.5
Protein calorie malnutrition	22.2	34.0
Vitamin A deficiency	22.7	22.2
Skin diseases	18.8	18.7
Gastro-intestinal disorders	27.2	29.9
Dental caries	14.8	9.0

Source: Devadas, R. and G. Kamalanathan, "A Woman's First Decade," Paper presented at the Women's NGO Consultation for Equality, Development and Peace, New Delhi, April 1985.

Table 6

Distribution of Male and Female Infants among Different Grades of Malnutrition

Location	Percentage of Total Children of Each Sex								Sample Size	
	Normal		Mild		Moderate		Severe			
	M	F	M	F	M	F	M	F	M	F
Bombay	34.4	25.6	42.5	43.2	18.3	25.4	2.8	4.5	939	851
Calcutta	19.6	20.3	42.7	36.9	25.0	27.5	8.2	10.6	637	677
Madras	30.1	20.4	41.7	43.8	23.0	28.3	3.1	5.7	828	867

Source: Adapted from Gopalan, C., "The Mother and Child in India," Economic and Political Weekly XX, No. 4, January 1985.

Table 7

Distribution of Male and Female Children under 5 in Different Grades of Malnutrition

Age Group	Percent of Children in Each Age-Sex Group							
	Normal		Mild		Moderate		Severe	
	M	F	M	F	M	F	M	F
Infants	56.7	20.8	25.6	30.5	15.3	30.4	2.4	18.4
Toddlers	36.6	14.3	34.4	35.7	21.0	35.3	8.0	14.7
Pre-Schoolers	34.7	27.9	39.5	37.2	21.6	38.2	4.3	6.7
All 0-5's	69.2	30.8	56.4	43.6	43.1	56.9	28.6	71.4

Source: Nutrition in Punjab, CARE, New Delhi, 1974.

Table 8

Distribution of Male and Female Children in Different Grades of Malnutrition by Income Class

Income Group	Percent of Children in Each Income Group								Sample Size	
	Normal		Mild		Moderate		Severe			
	M	F	M	F	M	F	M	F	M	F
Lower income Group	14.0	7.4	43.9	18.5	39.3	52.8	2.8	21.3	107	108
Upper income Group	27.7	5.8	46.5	31.4	25.7	55.8	0	7.0	101	86

Source: Levinson, F.J. (1974) Morinda: An Economic Analysis of Malnutrition among Young Children in Rural India. Cornell-MIT International Nutrition Policy Series, Cambridge, Mass.

Table 9

Foods Received by Male and Female Children of Different Ages in Rural Tamil Nadu

Food Items, weight in grams	3-4 year-olds			7-9 year-olds		
	RDA	Males	Females	RDA	Males	Females
Cereals	173	118	90	250	252	240
Pulses	55	22	18	70	49	25
Green leafy vegetables	62	3	0	75	0	0
Roots and tubers	40	15	13	50	42	0
Fruits	50	30	17	50	17	6
Milk	225	188	173	250	122	10
Sugar and jaggery	22	13	16	30	30	12
Fats and oils	30	5	2	50	23	8

Source: Devadas and Kamalanathan (1985) Op. cit.

Table 10

Proportions of Households and Individuals in Different States with Inadequate Calorie Intakes, 1982.

States	Average Intake Cals/CU/Day as % of Recommended Intake	Percent with Inadequate Cals	
		Households	Individuals
Kerala	0.92 (4)	44.6 (3)	24.2 (2)
Tamil Nadu	0.82 (8)	64.1 (8)	41.5 (5)
Karnataka	1.13 (1)	19.3 (1)	22.1 (1)
Andhra Pradesh	0.86 (7)	55.9 (6)	37.5 (4)
Maharashtra	0.88 (6)	60.5 (7)	42.8 (7)
Gujarat	0.96 (3)	43.4 (2)	27.9 (3)
Orissa	0.90 (5)	54.4 (5)	41.7 (6)
West Bengal	1.01 (2)	46.1 (4)	51.0 (8)
All 8 states pooled	0.93	48.5	-

Source: Report for the Year 1982, National Nutrition Monitoring Bureau, National Institute of Nutrition, Hyderabad, 1984.

Table 11

Percent Prevalence of Anemia in Different Parts of India

Location	Age Group (years)				
	1-5	6-14	15-24	25-44	45+
	M+F	F	F	F	M+F
Hyderabad	65.5	66.7	64.4	75.9	47.0
Calcutta	94.4	95.2	95.1	93.7	88.3
Madras	23.2	18.3	19.0	24.4	21.8
New Delhi	57.1	73.3	61.5	76.5	66.7

Source: Report of the ICMR Working Group (1982) American Journal of Clinical Nutrition 35, 1442.

Table 12

Age at Marriage of Females and Males in Different States, Rural and Urban Areas, 1981

States	Females		Males	
	Rural	Urban	Combined	Combined
Andhra Pradesh	16.8	18.9	17.3	23.0
Bihar	16.4	18.7	16.7	21.5
Gujarat	19.1	20.5	19.5	23.1
Haryana	17.3	20.1	17.9	21.7
Karnataka	18.7	20.5	19.3	25.9
Kerala	21.7	22.4	21.8	27.3
Madhya Pradesh	16.0	19.0	16.7	20.6
Maharashtra	17.7	20.3	18.8	24.2
Orissa	19.0	19.9	19.1	24.2
Punjab	21.0	21.1	21.0	24.4
Rajasthan	15.8	18.0	16.3	20.3
Tamil Nadu	19.9	20.9	20.3	26.0
Uttar Pradesh	16.2	19.4	16.9	21.0
West Bengal	18.5	21.5	19.3	25.7
ALL INDIA	-	-	18.3	23.3

Source: Census of India, 1981, Series 1, India, Part II-Special, Report and Tables Based on 5 Percent Sample Data, Office of the Registrar General, Ministry of Home Affairs, New Delhi, 1983.

Table 13

Percent of Married Females in Different Age Groups

Age Group	Females		Males	
	Rural	Urban	Total	Total
10-14 Years	7.8	2.2	6.6	2.6
15-19 Years	48.9	27.9	43.5	12.0

Source: Census of India, 1981, Series 1, India, Part II-Special, Report and Tables Based on 5 Percent Sample Data, Office of the Registrar General, Ministry of Home Affairs, New Delhi, 1983.

Table 14

Selected Nuptiality Indicators, India and Major States, 1981.

State	Married Females between 15-44 years (in thousands)	Proportion married females in age groups: 15-44	15-19	20-24	Rate of married couples per 1000 population
Andhra Pradesh	9,680	84.0	56.2	90.2	181
Bihar	12,612	88.5	64.0	93.5	180
Gujarat	5,711	76.4	26.7	83.0	168
Haryana	2,111	82.8	47.6	89.2	163
Karnataka	6,012	76.1	36.2	78.9	162
Kerala	3,705	60.7	14.1	57.9	146
Madhya Pradesh	9,687	87.0	62.2	91.7	176
Maharashtra	10,554	79.7	38.2	83.9	168
Orissa	4,346	77.4	30.8	86.7	165
Punjab	2,450	69.2	14.4	68.0	146
Rajasthan	5,980	88.6	64.3	94.7	175
Tamil Nadu	8,134	72.6	22.8	75.5	168
Uttar Pradesh	18,980	88.4	60.7	93.5	171
West Bengal	8,718	75.1	37.5	78.4	160
ALL INDIA	112,172	80.5	43.4	84.5	169

Source: Census of India, 1981, Series 1, India, Part II-Special, Report and Tables Based on 5 Percent Sample Data, Office of the Registrar General, Ministry of Home Affairs, New Delhi, 1983.

Table 15

Mean Age at Marriage of Females by Education Level, Rural and Urban, 1981

	Age in Years	
	Rural	Urban
All	16.5	17.6
Illiterate	16.3	16.8
Literate:		
Primary	17.1	17.4
Middle	17.8	18.1
Matric	19.3	19.8
Graduate	21.5	21.9

Source: Census of India, 1981, Series 1, India, Part II-Special, Report and Tables Based on Percent Sample Data, Office of the Registrar General, Ministry of Home Affairs, New Delhi, 1983.

Table 16

Age-Specific Marital Fertility Rates, India, 1978

Age Groups	Rural	Urban
15-19	175.2	197.3
20-24	270.7	278.4
25-29	243.4	204.2
30-34	181.5	123.9
35-39	122.8	73.4
40-44	62.0	28.3
45-49	26.5	10.5

Source: Survey Report on Levels, Trends and Differentials in Fertility, 1979, Office of the Registrar General, Ministry of Home Affairs, New Delhi, 1982.

Table 17

Cumulat. ve Percent Fertility, India, Rural & Urban, 1978

Age Groups	Rural	Urban
15-19	7.97	6.74
20-24	33.80	36.87
25-29	59.86	65.99
30-34	79.16	84.41
35-39	91.70	94.94
40-44	97.64	98.70
45-49	100.00	100.00

Source: Survey Report on Levels, Trends and Differentials in Fertility, 1979, Office of the Registrar General, Ministry of Home Affairs, New Delhi, 1982.

Table 18

Age-Specific Marital Fertility Rates by Age At Marriage, India, 1978

Age at Marriage	Rural Urban	Age Groups 15-19	20-24	25-29	30-34	35-39	40-44	45-49
Below 18 years	R	187.07	285.02	240.61	174.91	115.02	57.40	22.56
	U	218.84	286.30	189.35	121.15	71.25	25.65	9.48
18-20 years	R	79.90	254.99	246.66	190.88	134.58	67.69	32.25
	U	78.52	282.33	210.54	123.71	73.89	31.35	12.39
21-23 years	R	-	198.36	250.68	214.46	150.77	75.83	44.74
	U	-	217.45	243.56	125.18	76.63	34.61	10.21
Above 24 years	R	-	55.42	253.82	206.20	170.13	106.64	31.74
	U	-	9.57	206.15	149.52	92.09	34.93	12.47

Source: Survey Report on Levels, Trends and Differentials in Fertility, 1979, Office of the Registrar General, Ministry of Home Affairs, New Delhi, 1982.

Table 19

Percent Distribution of Live Births by Order of Birth and Age at Marriage, 1978

Age at Marriage		Order of Birth 1	2	3	4	5	6+	All
Below 18 years	R	21.60	19.60	17.41	13.90	10.34	17.15	100.00
	U	20.65	21.15	18.32	13.86	9.59	16.43	100.00
	T	21.39	19.95	17.60	13.89	10.18	16.99	100.00
18-20 years	R	27.45	22.99	18.03	12.61	8.14	10.78	100.00
	U	31.56	26.74	18.70	10.23	5.53	7.24	100.00
	T	28.59	24.02	18.22	11.96	7.41	9.80	100.00
Above 21 years	R	33.67	26.04	17.11	9.67	6.38	7.13	100.00
	U	43.05	29.38	14.39	6.83	3.07	3.28	100.00
	T	37.14	27.28	16.10	8.62	5.15	5.71	100.00

Source: Survey Report on Levels, Trends and Differentials in Fertility, 1979. Office of the Registrar General, Ministry of Home Affairs, New Delhi, 1982.

Table 20

Age-Specific Fertility and Marital Fertility Rates by Educational Level of the Women, India, 1978.

Education	R/U	15-19	20-24	25-29	30-34	35-39	40-44	45-49
				Age-Specific Fertility Rate				
Illiterate	R	89.50	242.10	239.34	180.75	117.82	56.41	22.12
	U	80.93	237.81	204.63	144.08	87.94	34.86	10.75
Literate but below Primary	R	52.75	217.21	207.64	138.21	100.76	39.48	14.76
	U	59.66	213.68	188.47	114.15	62.72	9.44	6.45
Primary but below Matric	R	25.56	183.67	210.50	148.89	74.20	23.93	5.64
	U	25.62	190.90	166.33	91.60	37.13	7.63	3.08
Matric and Above	R	22.74	97.02	152.07	118.42	49.86	47.13	9.57
	U	14.68	108.48	147.07	66.97	33.09	4.31	1.30
All Literates	R	38.98	190.51	203.11	139.85	91.68	36.56	12.83
	U	30.55	164.51	166.54	92.96	46.89	11.10	4.54
				Age-Specific Marital Fertility Rate				
Illiterate	R	174.56	267.60	247.88	188.11	126.27	64.27	27.46
	U	185.06	275.54	218.53	153.83	97.84	41.93	14.48
Literate but below Primary	R	176.13	277.48	222.87	145.74	109.08	45.05	19.23
	U	204.98	269.36	202.81	121.49	67.29	18.74	8.06
Primary but below Matric	R	178.94	294.47	236.49	157.87	80.07	26.67	6.99
	U	211.41	297.12	188.38	97.32	39.67	8.58	3.60
Matric and above	R	206.51	261.73	213.78	131.84	54.00	53.05	13.80
	U	217.82	270.50	195.37	76.05	36.28	4.81	1.55
All Literates	R	177.98	281.74	226.38	148.19	99.18	41.49	16.66
	U	209.25	280.28	195.36	100.70	50.48	12.55	5.51

Source: Survey Report on Levels, Trends and Differentials in Fertility, 1979, Office of the Registrar General, Ministry of Home Affairs, New Delhi, 1982.

Table 21

Percent Distribution of Live Births by Order of Birth and by Level of Education, 1978

Level of Education	Rural/ Urban	Order of Birth 1	2	3	4	5	6+
Illiterate	Rural	21.43	19.15	17.34	14.02	10.55	17.51
	Urban	19.32	19.85	17.17	13.61	10.39	19.66
	Total	21.09	19.26	17.31	13.96	10.53	17.85
Literate but below Primary	Rural	27.64	23.79	17.98	12.25	8.04	10.30
	Urban	23.54	21.61	18.69	13.43	9.28	13.45
	Total	26.37	23.12	18.20	12.62	8.42	11.27
Primary and above	Rural	33.92	28.23	18.05	9.70	5.00	5.10
	Urban	34.99	28.64	18.34	9.83	4.11	4.09
	Total	34.51	28.46	18.21	9.77	4.51	4.54
Literate	Rural	30.14	25.56	18.01	11.23	6.83	8.23
	Urban	30.97	26.17	18.46	11.09	5.93	7.38
	Total	30.50	25.83	18.20	11.17	6.44	7.86

Source: Survey Report on Levels, Trends and Differentials in Fertility, 1979, Office of the Registrar General, Ministry of Home Affairs, New Delhi, 1982.

Table 22

Birth Rates of Different Occupational Groups

Occupation	16 Round	18th Round		19th Round	
	Urban	Rural	Urban	Rural	Urban
Professional, Technical	30.5	34.0	26.9	37.6*	28.3
Admin. & Executive	28.1	38.3	26.3	38.7*	19.7
Clerical & related	31.9	34.3	30.3	na	na
Sales	32.4	36.3	31.0	35.0	31.4
Agriculture	35.0	37.2	31.3	37.3	36.4
Mining & related	31.4	28.2	50.0*	na	na
Transport & Communications	37.8	42.9	36.7	23.3*	35.8
Crafts & Production	36.1	38.3	34.9	40.8	38.7
Service, Sports & Recreation	34.8	38.0	31.7	41.5*	35.7
ALL OCCUPATIONS	33.0	37.0	31.5	37.3	34.3

Notes: * Sample size too small for reliable rate; na=not available.

Sources: National Sample Survey, 16th, 18th and 19th Rounds.

Table 23

Distribution of Deaths during Pregnancy and Childbirth by Specific Causes and Age Groups

Cause	15-24	25-34	35-44	45-54	All
	Percent of Deaths due to specific cause occurring in each age group(1985)				
Abortion	29.2	45.8	25.0	---	100.0
Toxemia	57.1	14.3	28.6	---	100.0
Anemia	22.9	35.4	29.2	12.5	100.0
Bleeding in Pregnancy or puerperium	33.3	45.5	21.2	---	100.0
Malposition of fetus	25.0	50.0	25.0	---	100.0
Puerperal Sepsis	41.4	37.9	20.7	---	100.0
Not Classified	38.6	27.3	29.5	4.5	100.0
	Percent of Deaths in Each Age Group due to each specific cause (1986)				
Abortion	8.9	7.5	6.7	---	8.0
Toxemia	13.9	8.9	13.3	---	11.9
Anemia	12.7	19.4	23.4	---	17.0
Bleeding in Pregnancy or puerperium	15.2	29.8	20.0	---	21.6
Malposition of fetus	3.8	6.0	13.3	---	6.2
Puerperal sepsis	17.7	7.5	13.3	---	13.1
Not classifiable	27.8	20.9	10.0	---	22.2
All Causes	100.0	100.0	100.0	---	100.0

Source: Causes of Death, Rural Survey, 1986, Office of the Registrar General, Ministry of Home Affairs, New Delhi, 1988.

Table 24

Infant Mortality Rates by Mother's Age At Marriage

Age at Marriage	Rural	Urban
Below 18 years	156	88
18-20 years	132	67
21 years and above	90	46

Source: Survey of Infant and Child Mortality, 1979. Office of the Registrar General, Ministry of Home Affairs, New Delhi, 1981.

Table 25

Infant Mortality Rate by Mother's Education

Education level	Rural	Urban
Literate	90	53
Primary and above	64	49
Literate below primary	105	59
Illiterate	132	81

Source: Survey of Infant and Child Mortality, 1979. Office of the Registrar General, Ministry of Home Affairs, New Delhi, 1981.

Table 26

Sex Ratio of Children Born and Surviving by Age of Mother, 1981

Age in Years	Born			Surviving		
	Rural	Urban	Total	Rural	Urban	Total
--15	876	820	887	877	814	868
15-19	940	935	939	958	962	959
15-49	915	902	912	892	895	893

Source: Census of India, 1981, Series 1, India, Part II, Special, Report and Tables based on 5 Percent Sample Data. Office of the Registrar General, Ministry of Home Affairs, New Delhi, 1983.

Table 27

Decades Required to Achieve a Literacy Rate of 85% in the Total Population or 100% among 5-14 Year-olds for Major States
Change in Literacy Rates between 1971 and 1981 for Major States

India/State	85% of Total Population			100% of 5-14 Year Population		
	Persons	Males	Females	Persons	Males	Females
India**	7.2	5.2	9.8	7.5	6.2	9.0
Andhra Pradesh	10.3	7.5	13.9	6.8	5.2	9.1
Bihar	9.4	6.3	14.6	7.5	5.9	9.5
Gujarat	5.2	3.7	7.0	3.9	3.4	4.4
Haryana	5.3	3.4	8.5	4.9	3.9	6.0
Karnataka	6.7	5.0	8.5	7.2	6.6	7.8
Kerala	1.5	1.1	1.7	1.9	2.1	1.8
Madhya Pradesh	10.0	6.7	15.1	10.7	8.4	3.6
Maharashtra	4.7	3.4	6.0	4.0	3.6	4.3
Orissa	6.3	4.3	8.9	6.6	5.3	7.8
Punjab	6.1	5.6	6.6	4.0	3.8	4.1
Rajasthan	11.4	6.4	24.9	14.4	8.9	5.1
Tamil Nadu	5.2	4.1	6.2	5.9	6.1	5.8
Uttar Pradesh	10.6	6.4	20.3	11.7	8.3	7.6
West Bengal	5.7	4.4	7.0	9.1	9.0	9.0

Projected from rates of change in literacy rates between 1971 and 1981.

** Excludes Assam

Source: Recent Literacy Trends in India, Office of the Registrar General, Ministry of Home Affairs, New Delhi, 1987.

Table 28

Literacy Rates among Scheduled Castes and Tribes by Sex and Rural-Urban Residence (1981).

		Percent Literate of Total Population			Percent diff.betw. Males & Females
		Total	Male	Female	
Scheduled Caste	Total	21.4	31.1	10.9	20.2
	Rural	18.5	27.9	8.5	19.5
	Urban	36.6	47.5	24.3	23.2
Scheduled Tribe	Total	16.4	24.5	8.0	16.5
	Rural	14.9	22.9	6.8	16.1
	Urban	37.9	47.6	27.3	20.3
General Population	Total	36.2	46.9	24.8	22.1
	Rural	29.7	40.8	18.0	22.8
	Urban	57.4	65.8	47.8	18.0

Source: Census of India, 1981, Series I, India, Paper 2 of 1984, General Population and Population of Scheduled Castes and Tribes, Office of the Registrar General, Ministry of Home Affairs, New Delhi, 1984.

Table 29

Agewise Distribution of Children Attending School: 1981

Age in Years	% Children attending School			
	Rural Male	Rural Female	Urban Male	Urban Female
5	9.91	7.01	28.49	25.73
6	31.29	21.19	55.02	49.65
7	49.16	32.88	72.53	65.43
8	52.34	32.45	75.50	66.80
9	65.30	41.45	83.58	75.41
10	57.70	32.05	78.17	68.17
11	68.32	38.97	84.22	74.16
12	55.33	26.79	75.25	63.90
13	59.60	27.94	77.35	64.86
14	51.84	21.02	71.31	57.37

Source: Census of India, 1981, Series I, India, Part II-B(i) Primary Census Abstract General Population, Office of the Registrar General, Ministry of Home Affairs, New Delhi, 1983.

Table 30

Workforce Participation Rates for Children not Attending School by Age, 1981

Age in Years	Main Workers (percent)			
	Rural Male	Rural Female	Urban Male	Urban Female
5	0.18	0.06	0.15	0.02
6	0.28	0.13	0.15	0.06
7	1.04	0.48	0.73	0.22
8	2.86	1.18	2.00	0.69
9	7.20	3.03	5.10	1.70
10	16.65	6.61	11.98	3.57
11	31.31	11.55	19.75	5.75
12	46.89	16.85	30.85	8.28
13	58.71	20.10	38.85	9.67
14	70.29	22.59	47.03	9.25

*Excludes Assam

Source: Census of India, 1981, Series 1, India, Part II-B(i) Primary Census Abstract General Population, Office of the Registrar General, Ministry of Home Affairs, New Delhi, 1983.

Table 31

Working Status of Children Aged 5-14 years (1971 and 1981)

	1971		1981	
	Male	Female	Male	Female
Percentage of Child Workers* to Child Population: Total	6.62	2.12	5.96	4.33
Urban	4.10	1.23	3.70	1.49
Rural	11.37	4.57	10.05	7.79
Percentage of Child Workers to Total Workers:	4.49	2.39	4.47	8.65

*Includes Main Workers and Marginal Workers.

Source: Child in India - A Statistical Profile, Ministry of Social and Women's Welfare, Government of India, New Delhi, 1985.

Table 32

Work Participation Rates for Main Workers by Age and Sex 1971, 1981

Age Group		Males		Females	
		1971	1981	1971	1981
All Ages	Total	52.61	51.62	12.06	13.99
	Rural	53.62	52.62	13.36	16.00
	Urban	48.80	48.54	6.65	7.28
0-14	Total	6.65	5.48	2.63	2.95
	Rural	7.56	6.31	3.05	3.52
	Urban	2.75	2.49	0.82	0.91
15-19	Total	55.32	51.00	15.78	18.46
	Rural	62.31	58.03	18.80	22.74
	Urban	28.32	31.51	5.51	6.21
20-24	Total	81.43	76.89	18.12	20.39
	Rural	86.56	82.69	20.58	24.36
	Urban	67.49	63.31	9.54	9.32

Source: Census of India, 1981, Key Population Statistics Based on 20 Percent Sample, Office of the Registrar General, Ministry of Home Affairs, New Delhi, 1983.

Table 33

Distribution of Male and Female Workers in the 5-14 Year Age Group among Nine Occupational Categories, 1981 (Percent of Total).

Category of Worker	Rural		Urban	
	Males	Females	Males	Females
Cultivators	43.9	36.8	6.1	5.3
Agricultural Labourers	39.9	51.6	12.2	23.2
Livestock, forestry, fishing, &c	7.8	3.3	3.7	1.8
Mining and Quarrying	0.2	0.2	0.3	0.4
Manufacturing, Processing, Servicing and Repairing a) Household Industry	2.5	3.8	8.0	18.2
b) Other than Household Industry	2.4	2.1	31.1	20.0
Construction	0.4	0.5	3.3	3.2
Trade and Commerce	1.3	0.4	19.0	2.9
Transport, Storage and Communication	0.1	0.0	3.0	0.4
Services	1.5	1.3	13.0	24.6

Source: Child in India - A Statistical Profile, Ministry of Social and Women's Welfare, Government of India, New Delhi, 1985.

Table 34

Average Population Covered by Key Health Personnel/Facilities in Different States, 1987.

State	PHC	SubC	LHV	MPWF	TBA
Andhra Pr.	43,964	6292	31,648	7563	955
Assam	60,918	7571	67,548	7380	2052
Bihar	55,721	6975	53,622	8874	1194
Gujarat	59,003	4224	28,347	4639	913
Haryana	45,136	5633	33,117	5555	1011
Himachal P.	25,771	4477	14,148	3775	503
Jammu&Kash.	37,946	9333	7,759	13645	1225
Karnataka	56,398	5483	27,756	3571	960
Kerala	50,872	6726	39,841	6542	9050a
Madhya Pr.	48,623	5967	30,818	5586	1077
Maharashtra	32,670	4924	41,236	4269	960
Orissa	37,519	5741	29,675	5105	741
Punjab	7,263	4799	16,608	4194	692
Rajasthan	51,310	6296	88,630	5685	1598
Tamil Nadu	46,464	4794	23,571	4832	1089
Uttar Pr.	50,767	5748	2,596	5070	716
West Bengal	34,561	5704	78,491	6882	1730
INDIA	40,215	5747	33,362	5505	1024

Note: PHC=Primary Health Centre, SubC=Sub-Centre, LHV=Lady Health Visitor, also known as Health Assistant Female, MPWF=Multi-Purpose Worker - Female, also known as Auxiliary Nurse Midwife (ANM), TBA=Trained Birth Attendant;
a) Kerala discontinued the Dai Training programme in 1980.

Source: Computed from data provided in Health Information of India 1987, Central Bureau of Health Intelligence, Ministry of Health and Family Welfare, New Delhi, 1988.

Appendix Table 1

Sex Ratios, by States and Union Territories, 1981

	Rural	Urban	Combined
INDIA	951	902	933
Andhra Pradesh	984	948	975
Assam	917	768	901
Bihar	963	832	946
Gujarat	959	905	942
Haryana	876	849	870
Himachal Pradesh	989	795	973
Jammu & Kashmir	897	875	892
Karnataka	978	926	963
Kerala	1,034	1,021	1,032
Madhya Pradesh	956	884	941
Maharashtra	987	850	937
Manipur	971	969	971
Meghalaya	965	904	954
Nagaland	899	688	863
Orissa	999	859	981
Punjab	884	865	879
Rajasthan	930	877	919
Sikkim	864	697	835
Tamil Nadu	987	956	977
Tripura	945	957	946
Uttar Pradesh	893	846	885
West Bengal	947	819	911
Andaman & Nicobar	774	720	760
Arunachal Pradesh	881	629	862
Chandigarh	769	688	769
Dadar & Nagar Haveli	981	884	974
Delhi	810	808	808
Goa, Daman & Diu	1,013	919	981
Lakshadweep	986	963	975
Mizoram	928	893	919
Pondicherry	977	992	985

Source: Census of India, 1981, Series 1, India, Paper 1 of 1982, Final Population Totals, Office of the Registrar General, Ministry of Home Affairs, New Delhi, 1983.

Appendix Table 2

Ratio of Female to Male Age-Specific Death Rates, 1981

	Age Group			
	0-4	5-9	10-14	15-19
INDIA	1.10	1.19	0.94	1.58
Andhra Pradesh	0.97	1.07	1.25	1.26
Assam	1.15	1.47	0.88	1.18
Bihar	1.12	1.49	0.94	1.71
Gujarat	1.06	0.80	0.94	1.81
Haryana	1.30	1.63	1.00	2.31
Himachal Pradesh	0.80	0.44	-	-
Jammu & Kashmir	0.97	2.40	2.75	2.00
Karnataka	1.06	1.14	2.40	1.65
Kerala	0.83	0.44	0.71	0.93
Madhya Pradesh	1.08	1.44	1.17	1.63
Maharashtra	1.03	0.77	0.79	1.25
Orissa	1.00	1.39	1.39	1.21
Punjab	1.16	0.83	0.94	2.00
Rajasthan	1.16	0.98	0.85	3.33
Tamil Nadu	1.00	0.97	1.00	1.23
Uttar Pradesh	1.29	1.29	0.62	1.57
West Bengal	0.90	1.79	1.30	2.69

Source: Sample Registration Bulletin, 1981, Office of the Registrar General, Vital Statistics Division, Ministry of Home Affairs, New Delhi, 1985.

Appendix Table 3

Distribution of Deaths by Cause and Age-Sex Groups, All-India, 1986

Causes	All		0-1		1-4		5-14		15-24	
	M	F	M	F	M	F	M	F	M	F
Accidents & Injuries	7.7	6.0	0.9	0.6	7.1	3.8	21.0	15.0	38.3	26.3
Childbirth & Pregnancy	-	2.0	-	-	-	-	-	-	-	16.0
Fevers	9.9	11.0	5.7	7.2	24.1	23.9	22.5	22.5	14.5	14.5
Digestive Disorders	7.7	7.7	3.8	4.3	21.7	20.3	18.3	15.3	10.2	12.3
Respiratory Disorders	21.5	17.6	16.4	17.4	23.0	23.8	13.1	21.4	12.6	10.9
Nervous Disorders	3.6	3.9	1.6	2.2	2.6	4.2	5.4	5.6	5.8	3.0
Circulatory Disorders	9.6	8.3	1.8	2.9	8.1	9.5	8.1	7.8	9.9	9.5
Other Clear Symptoms	8.4	8.8	3.3	3.1	13.4	14.5	11.6	12.4	8.7	7.5
Causes peculiar to Infancy	10.8	10.2	66.5	62.3	-	-	-	-	-	-
Senility	20.8	24.4	-	-	-	-	-	-	-	-
All Causes	100	100	100	100	100	100	100	100	100	100

Appendix Table 3. contd.

	25-34		35-44		45-54		55+	
	M	F	M	F	M	F	M	F
Accidents & Injuries	27.8	18.8	15.3	8.6	8.9	8.7	2.7	2.3
Childbirth & Pregnancy	-	12.8	-	7.6	-	-	-	-
Fevers	9.5	12.8	11.6	11.8	8.9	9.8	7.6	7.5
Digestive disorders	10.4	9.6	9.8	10.6	8.7	10.2	5.0	3.8
Respiratory disorders	25.5	18.6	32.3	24.7	33.6	28.7	20.5	14.6
Nervous disorders	3.1	3.1	3.5	5.5	3.2	4.3	4.3	4.2
Circulatory disord.	10.6	9.4	14.5	13.3	21.6	18.7	9.8	7.8
Other Clear Symptoms	13.1	14.9	13.0	17.9	15.1	19.6	6.7	6.1
Causes Peculiar to Infancy	-	-	-	-	-	-	-	-
Senility	-	-	-	-	-	-	43.4	53.7
ALL	100	100	100	100	100	100	100	100

Source: Causes of Death Rural Survey, 1986, Office of the Registrar General, Ministry of Home Affairs, New Delhi, 1988.

Appendix Table 4

Distribution of Male and Female Children (1-5 years) by Grade of Malnutrition in Selected States, 1980

State	Sample Size		Percent of Children in Each Age-Sex Group							
			Normal		Mild		Moderate		Severe	
	M	F	M	F	M	F	M	F	M	F
Andhra Pr.	432	401	10.2	19.5	44.0	54.9	40.7	22.9	5.1	2.7
Gujarat	142	129	3.5	7.0	33.8	49.6	50.0	36.4	12.7	7.0
Karnataka	390	362	8.0	19.0	41.5	51.4	43.3	27.1	7.2	2.5
Kerala	91	81	16.5	28.4	50.5	59.3	25.3	11.1	7.7	1.2
Orissa	116	95	9.5	15.8	44.0	37.9	37.0	43.2	9.5	3.1
Tamil Nadu	269	299	13.4	24.1	45.0	52.8	33.1	20.7	8.5	2.4
Uttar Pradesh	252	227	7.1	35.2	49.6	43.2	37.7	16.3	5.6	5.3
West Bengal	348	374	10.1	13.4	48.0	53.2	39.0	31.3	2.9	2.1
Pooled	2040	1968	9.6	20.1	44.6	51.3	39.3	25.6	6.5	3.0

Source: Report for the year 1980, National Nutrition Monitoring Bureau, National Institute of Nutrition, Hyderabad, 1981.

Appendix Table 5

Intake of Calories in Different Demographic Groups in Selected States

	by Landholding (acres)				by Occupation			by Social Group		
	0	<5	5-10	>10	Lab	Culti	Other	SC	ST	Non SC/ST
Kerala	1824	1904	2232	1589	1718	2040	2015	1608	--	1916
Tamil Nadu	2108	2320	2671	2718	2012	2548	2321	2020	2430	2361
Karnataka	2312	2576	2860	3099	2338	2901	2526	2343	2435	2736
Andhra Pr.	2274	2480	2824	2974	2358	2805	2338	2458	2450	2551
Maharasht.	2006	2178	2251	2517	1948	2413	2150	1901	2202	2272
Gujarat	1999	2042	2234	2444	1941	2219	2097	2104	1897	2144
Madhya Pr.	1977	1939	2108	2403	1905	2221	2059	1965	1995	2204
West Beng.	1866	2346	3055	3052	1806	2543	2414	2141	2122	2430
Uttar Pr.	1991	2116	2227	2377	2000	2192	2043	2083	--	2113

Source: Report for the Year 1979, National Nutrition Monitoring Bureau, National Institute of Nutrition, Hyderabad, 1980.

Appendix Table 6

Mean Nutrient Intakes of Women in Different Age Groups in Selected States as Percent of Recommended Amounts

States	Calories			Iron			Vitamin A		
	13-15	16-18	18+	13-15	16-18	18+	13-15	16-18	18+
Kerala	0.57	0.60	0.73	0.45	0.43	0.49	0.17	0.18	0.18
Tamil Nadu	0.67	0.84	0.92	0.63	0.67	0.75	0.17	0.28	0.24
Karnataka	0.82	0.97	1.23	0.93	0.98	1.24	0.21	0.36	0.30
Andhra Pr.	0.65	0.92	0.95	0.56	0.77	0.69	0.24	0.18	0.27
Maharashtra	0.64	0.73	0.96	0.70	0.76	0.69	0.33	0.37	0.36
Gujarat	0.72	0.74	na	0.63	0.59	na	0.32	0.60	na
Madhya Pr.	0.64	0.74	0.94	0.63	0.70	0.80	0.15	0.20	0.18
West Bengal	0.55	0.69	0.84	0.58	0.55	0.79	0.47	0.50	0.61
Uttar Pr.	0.55	0.82	0.91	0.53	0.69	0.84	0.19	0.15	0.30
RDAs	2500	2200	1900	35mg	35mg	30mg	750ug	750ug	750ug

Source: Report for the Year 1979, National Nutrition Monitoring Bureau, National Institute of Nutrition, Hyderabad, 1980.

Appendix Table 7

Age Specific Fertility Rates among 15-19 Year-olds in the Major States, Rural and Urban Populations, 1984

States	Rural	Urban	Total
Andhra Pradesh	133.0	100.0	125.0
Assam	88.0	35.2	84.3
Bihar	120.4	82.8	116.0
Gujarat	44.3	35.3	41.7
Haryana	87.3	50.8	79.6
Himachal Pradesh	65.7	25.9	63.8
Jammu & Kashmir	55.1	42.2	52.1
Karnataka	93.0	70.7	86.9
Kerala	35.4	49.4	37.9
Madhya Pradesh	133.3	76.8	121.0
Maharashtra	100.4	75.9	91.8
Orissa	73.9	54.0	72.2
Punjab	27.6	28.6	27.9
Rajasthan	115.4	76.4	107.7
Tamil Nadu	61.0	62.7	61.6
Uttar Pradesh	99.6	53.6	89.5
West Bengal	96.3	54.2	84.2

Source: Family Welfare Programme in India Yearbook 1986-87, Department of Family Welfare, Ministry of Health and Family Welfare, New Delhi, 1988.

Appendix Table 8

Selected Indicators of Fertility by Socio-Economic Levels, India, 1978.

	R/U	CBR	GFR	GMFR	TFR	TMFR	GRR
Religion							
Hindu	R	32.6	134.5	169.0	4.48	5.37	2.18
	U	25.6	104.1	137.0	2.97	4.37	1.44
Muslim	R	34.9	148.3	187.7	5.01	5.98	2.43
	U	30.6	122.9	176.6	3.98	5.53	1.93
Christian	R	25.7	99.0	153.5	3.34	5.07	1.62
	U	22.3	73.4	121.4	2.31	4.54	1.12
Sikh	R	29.6	120.7	180.5	3.97	5.66	1.93
	U	27.0	98.9	150.5	3.03	5.07	1.47
Caste							
Scheduled Caste	R	34.6	143.3	174.9	4.78	5.56	2.32
	U	31.8	122.2	163.1	3.88	5.03	1.86
Scheduled Tribe	R	31.0	121.7	162.5	4.07	5.25	1.98
	U	29.9	111.3	154.9	3.62	4.97	1.73
Non-SC/ST	R	32.5	134.0	170.2	4.48	5.40	2.18
	U	26.5	97.5	141.3	3.04	4.53	1.46
Educational Level							
Illiterate	R		140.4	167.7	4.74	5.48	
	U		117.2	144.5	4.00	4.93	
Literate but below Primary	R		122.3	175.9	3.85	4.98	
	U		106.7	139.1	3.27	4.46	
Primary but below Matric	R		99.2	198.0	3.61	4.90	
	U		84.6	146.0	2.61	4.23	
Matric and above	R		81.3	186.4	2.48	4.67	
	U		75.4	144.1	1.88	4.01	
All Literates	R		111.1	182.7	3.56	4.96	
	U		88.9	142.8	2.58	4.27	
All Women	R					5.4	
	U					4.6	

Appendix Table 8. contd.

	R/U	CBR	GFR	GMFR	TFR	TMFR	GRR
Occupation							
All Workers	R		112.6	148.5	3.85	4.91	
	U		62.8	103.7	2.25	4.11	
Non-Workers	R		143.3	178.7	4.76	5.61	
	U		102.3	144.4	3.24	4.65	
Per Capita Monthly Expenditure							
Below Rs. 50	R		190.8			6.05	
	U		183.0			5.72	
Rs.51-Rs.100	R		150.6			4.78	
	U		147.2			4.62	
Above Rs.101	R		106.9			3.49	
	U		87.9			2.97	
Age at Effective Marriage							
Below 18 years	R		168.5			5.41	
	U		137.2			4.61	
18-20 years	R		173.1			5.03	
	U		152.6			4.06	
21-23 years	R		177.9			4.67	
	U		157.9			3.53	
Above 24 years	R		172.3			4.12	
	U		126.7			2.52	

Notes: R=Rural, U=Urban, CBR=Crude Birth Rate, GFR=General Fertility Rate, GMFR=General Marital Fertility Rate, TFR=Total Fertility Rate, TMFR=Total Marital Fertility Rate, GRR=Gross Reproductive Rate.

Source: Survey Report on Levels, Trends and Differentials in Fertility, 1979. Office of the Registrar General, Ministry of Home Affairs, 1982.

Appendix Table 9(a - d)

Ranking of Major States by Various Fertility/Socio Economic Indicators

Appendix Table 9a: Mortality Indices

Death Rate (1985)		Expectation of Life at Birth (1981-86 Projection)			Infant Mortality Rate (1985)		Percentage of Maternal Deaths Child Birth & Pregnancy to Total Deaths (Rural) - 1985	
Kerala	6.5	Kerala	69.87	65.23	Kerala	(31)	Haryana	(0.4)
Maharashtra	8.4	Punjab	64.34	64.31	Maharashtra	(68)	Gujarat	(0.6)
Karnataka	8.8	Karnataka	61.06	60.15	Karnataka	(69)	Maharashtra	(0.6)
Punjab	8.9	Maharashtra	60.66	59.85	Punjab	(71)	Orissa	(0.7)
Haryana	9.1	Andhra Pradesh	59.98	56.10	West Bengal	(74)	Madhya Pradesh	(0.8)
Tamil Nadu	9.5	Haryana	59.59	61.41	Tamil Nadu	(81)	Tamil Nadu	(0.9)
West Bengal	9.6	Gujarat	58.30	55.34	Andhra Pradesh	(83)	Punjab	(1.1)
Andhra Pradesh	10.3	Tamil Nadu	57.85	58.25	Haryana	(85)	Kerala	(1.1)
Gujarat	10.8	West Bengal	56.28	56.95	Gujarat	(98)	Bihar	(1.3)
Rajasthan	13.2	Rajasthan	55.44	54.80	Bihar	(106)	Karnataka	(1.5)
Orissa	14.0	Bihar	52.30	55.21	Rajasthan	(108)	Andhra Pradesh	(1.5)
Madhya Pradesh	14.2	Orissa	51.90	54.13	Madhya Pradesh	(122)	Himachal Pradesh	(1.6)
Bihar	15.0	Madhya Pradesh	51.46	53.24	Orissa	(132)	Uttar Pradesh	(1.7)
Uttar Pradesh	15.8	Uttar Pradesh	46.89	51.14	Uttar Pradesh	(142)	Rajasthan	(2.8)

Appendix Table 9b: Fertility Indices

Female Mean Age at Marriage (1981)		Crude Birth Rate (1985)		Total Fertility Rate (1984)		Couple Protection Rate (as on 31st March, 1985)	
Kerala	21.85	Kerala	(23.3)	Krala	(2.4)	Maharashtra	(51.8)
Punjab	21.04	Tamil Nadu	(24.7)	Tamil Nadu	(3.3)	Punjab	(48.9)
Tamil Nadu	20.22	Punjab	(28.5)	Karnataka	(3.8)	Haryana	(45.8)
Gujarat	19.51	Maharashtra	(29.0)	Maharashtra	(3.8)	Gujarat	(43.5)
West Bengal	19.26	West Bengal	(29.4)	Punjab	(3.8)	Kerala	(38.1)
Karnataka	19.20	Karnataka	(29.6)	West Bengal	(3.9)	Tamil Nadu	(36.1)
Orissa	19.04	Andhra Pradesh	(29.9)	Andhra Pradesh	(4.0)	Orissa	(32.8)
Maharashtra	18.76	Orissa	(30.7)	Gujarat	(4.0)	Karnataka	(32.8)
Haryana	17.87	Gujarat	(33.0)	Orissa	(4.3)	Andhra Pradesh	(32.0)
Uttar Pradesh	17.77	Haryana	(35.7)	Haryana	(5.0)	Madhya Pradesh	(29.5)
Andhra Pradesh	17.25	Uttar Pradesh	(37.6)	Madhya Pradesh	(5.1)	West Bengal	(27.3)
Bihar	16.53	Bihar	(37.8)	Rajasthan	(5.7)	Rajasthan	(19.8)
Madhya Pradesh	16.52	Madhya Pradesh	(39.4)	Uttar Pradesh	(5.9)	Bihar	(17.2)
Rajasthan	16.09	Rajasthan	(39.7)	Bihar	(5.9)	Uttar Pradesh	(17.1)

Appendix Table 9(a - d)

Ranking of Major States by Various Fertility/Socio Economic Indicators

Appendix Table 9c: Socio-Economic Indices

Female Literacy (1981)		Level of Female Enrollment in Schools 6-11 yrs (Sept 30, 1984)		11-14 yrs (Sept 30, 1984)		% of Women Employed in the Organised Sector to the Total Employed in the Organised Sector as on 30.6.84		Population below Poverty Line (1983-84)		Per Capita Net Domestic Product at 1970-71 Prices (1983-84)	
Kerala	63.73	Tamil Nadu	(129.6)	Kerala	(89.7)	Kerala	(35.1)	Punjab	(13.8)	Punjab	(1473)
Tamil Nadu	34.79	Maharashtra	(120.1)	Tamil Nadu	(59.7)	Tamil Nadu	(19.6)	Haryana	(15.6)	Haryana	(1092)
Maharashtra	34.79	Kerala	(99.9)	Punjab	(55.2)	Karnataka	(13.3)	Gujarat	(24.3)	Maharashtra	(1013)
Punjab	33.69	Punjab	(98.7)	Maharashtra	(52.9)	Punjab	(13.1)	Kerala	(26.8)	Gujarat	(985)
Gujarat	32.30	Gujarat	(97.7)	West Bengal	(45.8)	Andhra Pradesh	(12.4)	Rajasthan	(34.3)	West Bengal	(817)
West Bengal	30.25	Andhra Pradesh	(91.1)	Karnataka	(45.6)	Maharashtra	(11.3)	Maharashtra	(34.9)	Andhra Pradesh	(716)
Karnataka	27.71	West Bengal	(84.3)	Gujarat	(40.6)	Gujarat	(11.1)	Karnataka	(35.0)	Karnataka	(715)
Haryana	22.27	Karnataka	(82.8)	Haryana	(35.6)	Rajasthan	(10.5)	Andhra Pradesh	(36.4)	Tamil Nadu	(642)
Orissa	21.12	Haryana	(73.8)	Andhra Pradesh	(32.1)	Haryana	(9.4)	West Bengal	(39.2)	Rajasthan	(638)
Andhra Pradesh	20.39	Orissa	(72.9)	Orissa	(25.5)	West Bengal	(9.2)	Tamil Nadu	(39.6)	Kerala	(620)
Madhya Pradesh	15.53	Madhya Pradesh	(62.0)	Uttar Pradesh	(22.5)	Madhya Pradesh	(8.9)	Orissa	(42.8)	Madhya Pradesh	(605)
Uttar Pradesh	14.04	Bihar	(57.5)	Madhya Pradesh	(19.8)	Bihar	(7.4)	Uttar Pradesh	(45.3)	Uttar Pradash	(566)
Bihar	13.62	Uttar Pradesh	(55.1)	Bihar	(17.1)	Orissa	(7.3)	Madhya Pradesh	(46.2)	Orissa	(559)
Rajasthan	11.42	Rajasthan	(44.6)	Rajasthan	(15.2)	Uttar Pradesh	(7.1)	Bihar	(49.5)	Bihar	(468)

Appendix Table 9d: Health Service Indices

No. of Doctors per Lakh Population (31.12.85)		Registered Nurses per Lakh Population (31.12.1984)		Other Health Workers per Lakh Population (31.3.86)		Percentage of Births Attended at Institutions and by Trained Professionals	
Maharashtra	(55.6)	Punjab	(91.5)	Tamil Nadu	(25.8)	Haryana	(76.7)
Andhra Pradesh	(49.1)	Kerala	(61.8)	Uttar Pradesh	(22.9)	Kerala	(74.3)
West Bengal	(47.3)	Tamil Nadu	(52.8)	Orissa	(22.6)	Punjab	(67.6)
Madhya Pradesh	(26.7)	Maharashtra	(45.6)	Kerala	(20.1)	Tamil Nadu	(57.3)
Gujarat	(25.2)	Andhra Pradesh	(23.5)	West Bengal	(14.1)	Gujarat	(49.2)
Uttar Pradesh	(24.4)	West Bengal	(17.7)	Karnataka	(14.0)	Karnataka	(49.1)
Bihar	(21.1)	Rajasthan	(17.3)	Rajasthan	(12.0)	Andhra Pradesh	(46.8)
Punjab	(19.2)	Madhya Pradesh	(17.1)	Punjab	(11.5)	Maharashtra	(43.1)
Haryana	(16.3)	Karnataka	(16.9)	Haryana	(9.5)	West Bengal	(33.7)
Kerala	(15.5)	Gujarat	(15.6)	Andhra Pradesh	(8.0)	Madhya Pradesh	(27.7)
Orissa	(14.5)	Haryana	(15.1)	Madhya Pradesh	(7.6)	Uttar Pradesh	(24.4)
Tamil Nadu	(13.4)	Orissa	(13.0)	Maharashtra	(5.8)	Bihar	(21.1)
Karnataka	(9.5)	Bihar	(10.9)	Bihar	(5.8)	Orissa	(19.3)
Rajasthan	(8.9)	Uttar Pradesh	(7.7)	Gujarat	(4.3)	Rajasthan	(17.2)

Appendix Table 10

Female Literacy Rates and Selected Associated Variables for Different States and India, 1981

St	Lit	U	LFP	Emp	SCST	IMR	FMR	MAM	Mar	CPR	CBR	TFR
*I	25.7	23.7	14.0	16.0	23.7	110	934	18.7	80.5	22.3	33.9	4.5
AP	20.0	23.3	27.0	12.0	20.7	86	975	17.6	84.1	26.7	31.7	4.0
Bi	13.2	12.5	9.1	8.4	23.2	118	946	17.1	88.6	12.3	39.1	5.7
Gu	33.2	31.1	11.0	19.4	21.6	116	942	19.6	76.3	32.8	34.5	4.3
Ha	21.6	21.9	4.7	26.3	19.0	101	870	18.2	80.6	30.3	36.5	5.0
Ka	28.2	28.9	19.0	19.0	20.0	69	963	19.4	76.1	22.9	28.3	3.6
Ke	70.8	18.7	12.8	43.9	11.0	37	1032	21.9	60.6	29.4	25.6	2.8
MP	15.9	20.3	22.3	8.2	37.7	142	941	17.2	87.1	21.1	37.6	5.2
Ma	34.6	35.0	24.0	13.5	16.6	79	937	18.9	79.8	35.2	28.5	3.6
Or	21.2	11.8	10.7	15.6	37.5	135	981	19.1	77.4	24.8	33.1	4.3
Pu	32.4	27.7	2.3	64.0	26.7	81	879	21.1	69.4	25.0	30.3	4.0
Ra	12.0	21.0	9.3	14.8	29.4	108	919	17.0	88.5	15.3	37.1	5.2
TN	34.7	33.0	22.4	17.5	19.4	91	977	20.2	72.7	28.6	28.9	3.4
UP	13.9	17.9	5.4	11.7	21.4	150	885	18.3	88.4	11.6	39.6	5.8
WB	33.3	26.5	5.8	38.4	28.0	91	911	19.4	74.7	22.0	33.2	4.2
r_1		0.30	0.06	0.59	-0.58	-0.78	0.53	0.87	-0.91	0.59	-0.79	-0.8
r_2		0.83	0.13	0.51	-0.39	-0.64	0.09	0.84	-0.89	0.76	-0.80	-0.8

Notes: St=States, Lit=Literacy Rate among Females aged 15 and above, U=Percent Urban Population, LFP=Female Main Workers as percent of Female Population, Emp=Percent of Female Main Workers in Non-agricultural and Non-household Industry Employment, SCST=Percent of Females classified as Scheduled Caste and Scheduled Tribe, IMR=Infant Mortality Rate, FMR=Female/Male (Sex) Ratio, MAM=Mean Age at Marriage, Mar=Percent Currently Married of 15-44 year old Females, CPR=Couple Protection Rate, ie. Percent of Couples with wife in the 15-44 year reproductive age group who are effectively protected against conception, CBR=Crude Birth Rate, TFR=Total Fertility Rate.

r_1 is the correlation coefficient between the column variable and Lit, the literacy rate among females aged 15 and above with the state of Kerala included.

r_2 is the correlation coefficient as above with Kerala excluded.

*India, excluding Assam.

Source: Recent Literacy Trends in India, Office of the Registrar General, Ministry of Home Affairs, New Delhi, 1987.

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